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SUMMARY OF RECENT ABSTRACTS*

IX. LEPROSY†

General

In *Public Health Reports* (p. 296) there is a collection of abstracts of papers read at a conference on leprosy at Carville in 1956, and in the *East African Medical Journal* (p. 1419) a collection of papers read at a conference on tuberculosis and leprosy at Dar es Salaam. These cannot effectively be summarized further and should be read in full, and the same is true of the account of the discussion on classification of leprosy by KITAMURA and NISHIURA (p. 51).

SOARES (p. 704) argues for a serious consideration of the mental and social aspects of leprosy work; the mentality and personality of the patient—particularly the infective patient—should be sympathetically studied.

GONZÁLEZ PRENDES *et al.* (p. 966) report on the work done at the national leprosy sanatorium in Cuba since its foundation in 1944.

Epidemiology

DAVISON (p. 827) records a number of Europeans and Africans who have acquired leprosy in leprosy institutions in South Africa, and makes a plea for adequate hygienic measures in persons in contact with leprosy patients. CAMPOS *et al.* (p. 698) found that children of parents with lepromatous leprosy, but who have been separated from the parents, tend to develop the disease (if they do develop it) within the first 3 years, but

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1957, v. 54. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on leprosy in this series see the November issues of the *Tropical Diseases Bulletin* each year since 1939.

during early life they have considerable resistance which may be transitory. When this disappears its place may be taken by acquired resistance induced either by leprosy or tuberculous infection or both. In a large number of contacts of leprosy patients QUAGLIATO (p. 1192) reports that 7·8% of spouses, 9·9% of children, 9·0% of parents, 8·8% of siblings and 3·3% of others contracted the disease. All the patients who infected their spouses had the lepromatous form.

VOGELSANG (p. 965) discusses leprosy in Norway and the great reduction in incidence since Hansen's day, and ØKLAND (p. 965) refers to the theory sometimes held there that it is transmitted by the flea.

KIVITS (p. 177) calculates that the incidence of leprosy in the Belgian Congo may be as high as 4 or 5% in the equatorial forest belt. There are 20 leprosaria. In 1955 some 184,686 patients (about 86% of the whole) were under ambulant treatment with DDS.

GEHR (p. 1087) comments on the high incidence of leprosy in children in Surinam, especially in Creoles. In São Paulo leprosy is noticed most in immigrants, but BECHELLI and ROTBERG (p. 438) do not regard this as evidence of racial susceptibility but rather as evidence of strain of adaptation to new conditions, earlier diagnosis, and undue exposure to infection because of ignorance. In 1955 the known leprosy incidence in the Federal District of Rio de Janeiro was 1·12 per 1,000 of whom nearly half were in institutions. LIRA *et al.* (p. 1086) found higher incidence in males than females and relate this to greater opportunity for infection from fortuitous contacts.

CHUNG-HOON and HEDGCOCK (p. 576) give an account of leprosy in Hawaii which seems to indicate that the Hawaiians are rather more susceptible than the Japanese. RODRIGUEZ (p. 1423) gives an account of leprosy control in the province of Cebu, Philippines, where treatment is now the basis of control. The incidence for the province is 2·37 per 1,000, but it is falling.

Aetiology

FREIRE (p. 175) claims to have cultivated and frequently subcultured *Myco. leprae* in a modified Kirchner medium.

RIDLEY (p. 833) argues that the numerical index derived from serial biopsies of the skin is broadly equivalent to a combination of the clinical impression of the size of the lesions and their skin-smear index, and can be used satisfactorily in therapeutic trials of new drugs to assess their value. Leprosy bacilli can be detected in biopsy material by fluorescence microscopy, which is recommended by NERURKAR and KHANOLKAR (p. 51).

HANKS (p. 1193) discusses the method of making skin smears so that the numbers of leprosy bacilli can be estimated. He (pp. 298, 439) discusses the loss of leprosy bacilli in paraffin sections by the use of xylene and other reagents, and in the process of staining, and suggests techniques to overcome this. The technique of processing biopsy specimens for detection of leprosy bacilli is also discussed by LOWY (p. 577).

Lepromin and tuberculin tests: Relationship between leprosy and tuberculosis

A general discussion of the lepromin reaction is contributed by Rotberg (p. 48). In a histological study of the lepromin reaction Bechelli *et al.* (p. 1194) found that in lepromatous leprosy after bacteriological examination had become negative there was never a true tuberculoid histological picture, even if the reaction was clinically positive, but it was always histologically positive in indeterminate and tuberculoid cases.

Hadler and Ziti (p. 55) investigated the lepromin reaction in rats previously inoculated with BCG or *Myco. leprae-murium*. Some details are given in the original abstract.

Lowe and McFadzean (p. 49) tested Nigerian children with tuberculin and lepromin and found a correlation between the results which might have been due to simultaneous exposure to both tuberculosis and leprosy, though the tuberculin rate was higher than could be explained by the local tuberculosis incidence rate. In healthy adults and children Lowe and Davey (p. 1194) found a close association between high sensitivity to tuberculin and positivity to lepromin, and in low degrees of tuberculin sensitivity the reaction may be non-specific. In one-third of a group of lepromatous patients the high degree of sensitivity to tuberculin was unable to induce a corresponding sensitivity to lepromin, and BCG would probably not do so. Wade (p. 1195) discusses the relationship between the lepromin reaction and non-specific reactivity to tuberculin. People who react to small doses of tuberculin react most to lepromin, those who require larger doses of tuberculin are less likely to be lepromin-positive, and those completely negative to tuberculin are least likely to be lepromin-positive.

Chambon and Destombes (p. 176) found that the results of the Mantoux test were practically the same in leprous subjects and in those without leprosy; most of the leprosy subjects positive to both tuberculin and lepromin had tuberculoid disease but most of those allergic to tuberculin and not to lepromin had the lepromatous type. Allergy to tuberculin is not always enough to cause allergy to lepromin.

Souza Campos *et al.* (p. 50) found agreement between the lepromin and tuberculin reactions in healthy people who had been exposed to tuberculosis but not to leprosy, in healthy persons who had been exposed to leprosy when they were first exposed to tuberculosis infection, and in tuberculosis patients. There was great disagreement in lepromatous leprosy with tuberculosis, but there was good agreement in persons vaccinated with BCG.

From tests on tuberculous persons Collier *et al.* (p. 1423) conclude that tuberculous infection markedly increased reactivity to the Mitsuda lepromin test. The complement-fixation test with the Essen antigen was strongly positive in 67% and positive in 19% of lepromatous patients.

In Ecuador a lepromin survey showed a lower positive rate in areas of high leprosy incidence than in other areas where the disease is not

common; Blum Gutiérrez (p. 699) suggests that the higher tuberculosis (and BCG) infection in the low leprosy areas produces a proportion of positive lepromin reactions.

Floch (p. 175) found that a suspension of normal skin gave a positive late reaction on intradermal injection in 54% of patients with tuberculoid leprosy (against 90% with the whole antigen), but not in lepromatous leprosy. He argued that lepromin contains elements of the bacilli, leprous tissue and normal skin. Kooij and Gerritsen (p. 577) report similar results with a suspension of normal skin, and they argue that the Mitsuda reaction is a foreign-body reaction and that it is useless to attempt to correlate the lepromin and the tuberculin tests to prove an immunological relationship between leprosy and tuberculosis.

Floch (p. 444) compared the reactions provoked by injection of various antigens prepared by extracting BCG with different solvents, with the lepromin reaction. Details are given in the original.

Muir (p. 696) discusses the relationship of tuberculosis and leprosy, and of the respective organisms. In tuberculosis the strains of tubercle bacilli vary in virulence and the resistance of the hosts also varies. In leprosy there is no indication of variation of virulence in the organisms. Tubercle bacilli can be cultivated but leprosy bacilli have not yet been cultivated. In tuberculosis there is tissue destruction, in leprosy there is granuloma formation. The leprosy bacillus, unlike any other bacterium, seeks the peripheral nerves. The tuberculin test indicates past infection, the lepromin test is chiefly useful in prognosis, and may be positive in persons who have had no contact with leprosy, and may be stimulated by BCG. Fernández (p. 697) argues that leprosy and tuberculosis are antagonistic diseases, and among other arguments cites the finding that in conjugal infection from one lepromatous partner few of the secondary cases were lepromatous, probably because the spouses were protected by prior tuberculous infection. The subject is obscure, and he suggests various lines of research.

Complement-fixation and haemagglutination tests

Collier and Gehr (p. 1087) used a tuberculosis antigen for the complement-fixation test with leprosy sera; there was a titre of 1 in 40 or more in 49% of patients with globi, but only 5% of those not showing bacilli. Lepromin-negative patients gave a titre of 1 in 40 in 36% of cases, but lepromin-positive patients in only 11%. They therefore argue that patients lacking resistance (lepromin-negative) tend to produce antibodies, and *vice versa*, and this is impossible to conceive. The theory of the lepromin test therefore needs re-assessment. With a similar antigen prepared from tubercle bacilli de Almeida *et al.* (p. 703) found a high proportion of complement-fixing antibodies at titres over 10 in lepromatous leprosy, but much lower proportions in patients under treatment, or cured.

Tanimura *et al.* (p. 1193) use an antigen consisting of cardiolipin 1, cholesterol 5, and cephalin 10, in the complement-fixation test for leprosy, finding it positive in 92·4% of lepromatous, 73·9% of tuberculoid, and 86·4% of neural cases. This antigen is useful for clinical purposes.

Kent *et al.* (p. 1422) subjected leprosy sera to several tests for syphilis, and found that tests with lipoidal antigen tended to give more reactions than those with cardiolipin.

Floch and André (p. 176) were unable to confirm the claim made by Ogata that he had found an antigen which gave a serological reaction specific for leprosy.

Floch (p. 440) used lepromin treated with ultrasonic radiation for the haemagglutination test in leprosy, but does not think that it has any advantage over other antigens previously used. Kerbastard (p. 966) found the haemagglutination test, with a tuberculin fraction as antigen, useless for the diagnosis or classification of leprosy; it might have a value in estimating progress, especially in lepromatous leprosy.

Clinical findings

Jopling (p. 440) gives an account of the clinical features of leprosy as it may be seen in Europeans.

Convit *et al.* (p. 1196) discuss borderline leprosy; details are given in the original abstract, particular mention being made of the intravenous methylene blue test, which picks out lepromatous lesions which may be distributed inside borderline patches.

Letichvskaia (p. 1421) describes a method for measuring the local temperature of the skin, and its electrical resistance, which can be a useful diagnostic measure in early leprosy by revealing autonomic changes. Fritschi (p. 53) discusses the pattern of sensory loss in leprosy and its causation.

Post-mortem evidence in Surinam suggests that the diagnosis of leprosy in cases of thickening of the nerves without other signs is not justified (Gehr and Stolze, p. 298).

Shadows in the lung were detected by Nègre and Fontan (p. 578) in leprosy patients in the stage of lepra reaction, but they disappeared after the reaction had subsided and may have been due to temporary allergic infiltration. The same authors (p. 579) describe the pathogenesis of bone lesions in leprosy.

Bose (p. 579) describes trophic ulcers in leprosy, and their management.

Paterson (p. 1088) discusses bone changes in leprosy, which may be specific, non-specific due to secondary infections and anaesthesia, or osteoporotic mainly due to disuse. The original paper is illustrated to show these changes.

Somerset and Sen (p. 299) describe appearances which they believe to indicate leprotic lesions of the posterior segment of the eye, which are

rare. They were not unlike retinal tubercles and were located at the periphery of the retina. Changes in the cornea detected with the slit-lamp microscope are described by HIBI (p. 578).

ROSS (p. 829) studied serum magnesium levels in leprosy, which, *per se*, does not appear to affect the metabolism of this metal.

GEHR (p. 828) discusses relapses, and suggests that to prevent them there should be prolonged treatment of patients with arrested disease, and periodical examinations. LARA and NOLASCO (p. 829) discuss the self-healing lesions observed at Culion.

Treatment

Sulphones and other drugs

By using radio-active DDS CHATTERJEE and PODDAR (pp. 176, 702) observed that after treatment the concentration in leprous skin is 10 times greater than in normal skin.

ROY (p. 54) observed lepromatous patients after they had been treated with DDS for up to 5 years. Most were bacteriologically improved but it was not possible to predict from the degree of positivity how quickly improvement would take place. SERIÉ and SCHALLER (p. 1090) examined the sera of patients by electrophoretic methods and were able to detect improvement in those treated with sulphones. By this method it is possible to follow the course of the disease.

In patients in the part of Banalia treated by weekly injections of DDS VAN DER MEULEN and MELEN (p. 1198) found apparent cure in 21·7% of tuberculoid, 5·5% of lepromatous and 4·16% of indeterminate cases; but there was improvement in 60–70%.

FLOCH (p. 580) finds that with injection of DDS suspension he has fewer leprosy reactions than with oral administration. He prefers an agar-saline basis with DDS grains of 90–120 microns, and considers that a chaulmoogra base does not add to the effectiveness of DDS. On the other hand, in French West Africa the mobile units give intramuscular injections of 1·25 gm. DDS in 5–6 cc. of ethyl esters of chaulmoogra, twice each month, though in towns the oral route is used for patients who can attend regularly (LAURET *et al.*, p. 580). LAVIRON *et al.* (p. 1089) use DDS suspended in chaulmoogra in tuberculoid leprosy, with great success, and with considerable benefit in lepromatous leprosy. This is not suitable for acute cases, but is particularly useful in chronic cases in which improvement under DDS alone has ceased. After treatment with DDS by injection of 1·25 gm. in chaulmoogra esters twice each month for 3½ years, HUGON and PIERON (p. 1197) in the Belgian Congo found a cure rate of 40% and remarkable improvement in 45% of a group of patients with indeterminate or tuberculoid leprosy.

GEORGES and LECHAT (p. 702) have used for injection DDS dissolved in a special excipient.

DAVEY *et al.* (p. 831) and LAVIRON *et al.* (p. 832) report favourably on a limited trial of diamino diphenyl sulphoxide (DDSO) in various forms

of leprosy; it is worthy of further trial. It was compared favourably by Buu-Hoï *et al.* (p. 832) with derivatives of thiocarbanilides, with which it could be combined.

Mukerjee and Sen (p. 1089) found that the addition of yeast and iron to DDS did not counter the tendency of DDS to produce anaemia.

Floch (p. 441) writes favourably of monoisopropyl and diisopropyl sulphone in various forms of leprosy. Dipropyl sulphone is excreted slowly, and Floch *et al.* (p. 701) adopted weekly oral administration of 700 mgm. plus 300 mgm. of DDS. This was as effective as giving DDS twice each week. A variation was to inject DDS in agar saline once each month, supplemented by the oral mixture in the fourth week of each month.

A condition described as glandular fever and exfoliative dermatitis precipitated by sulphones has been described previously, but Leiker (p. 1199) who observed the condition in Netherlands New Guinea ascribes it to an allergic reaction to the drug.

Hayashi and Tachikawa (p. 442) have used a colloid preparation of chalmoogra oil for intravenous injection in leprosy which had not responded to Promin.

Certain leprosy patients cannot stand treatment with DDS, especially some with major tuberculoid disease, and some with reactional and borderline disease; Wheate (p. 1321) suggests that thiosemicarbazone should be used for these patients. Huehne *et al.* (p. 177) found good results with thiosemicarbazone applied locally, together with small oral doses, in leprous lesions of mucous membranes and in ulcers.

In a comparison of sulphone with the usual tuberculosis drugs in lepromatous leprosy, Davison (p. 1199) found little difference in effectiveness.

The leprosy reaction

Floch and Mailloux (p. 700) discuss the prognostic implications of the leprosy reaction; in bacteriologically negative patients and when induced by sulphone treatment it was usually followed by improvement, but in bacteriologically positive patients the disease may be aggravated. Smaka and Capp (p. 1090) deny that the lepra reaction is ever useful, and consider that it always aggravates the condition. In acute cases they use chlorpromazine and an antihistamine, with good results. In subacute cases the specific anti-leprosy treatment is continued together with chlorpromazine. They also (p. 1091) use chlorpromazine for nerve pains, by the oral, intravenous or intramuscular route. Valette (p. 1199) also used an antihistamine, histopyrrodine, for the lepra reaction, with good result. It was not necessary to interrupt the sulphone treatment.

Jopling and Cochrane (p. 443) have used cortisone and corticotrophin successfully in the allergic phases of leprosy, in which sulphone treatment may be continued, though perhaps in reduced dosage. For persisting neuritis sulphone treatment should be stopped, and procaine

with hydrocortisone should be injected into the nerve; but if there is caseation, hormone treatment should be avoided. SHUTTLEWORTH (p. 581) found cortisone and corticotrophin useful in the acute forms of the lepra reaction, but less so in the chronic forms. NICHOLAS (p. 442) used cortisone in treating the complications of leprosy, mostly with good results, but he suggests that unless there is improvement in the first few days it should not be continued. In comment Muir suggests that a bolder attitude has lately been adopted.

MONTESTRUC (p. 443) suggests using the pituitary somatotrophic hormone (which has a good effect in the lepra reaction) together with cortisone if prolonged treatment is necessary, so as to counteract any undesirable effects of the cortisone.

Some improvement was observed by DE MACEDO and BERTI (p. 54) who gave isoniazid to lepromatous patients with lepra reaction. They regard this as the best oral treatment for this condition.

CONTRERAS *et al.* (p. 701) found improvement in patients with lepra reaction after treatment with aureomycin or polyvidone, but not with gamma globulin.

Colchicoside has been advocated for the treatment of the lepra reaction, but SAMUEL (p. 700) did not find it an improvement on other treatments.

Other treatments

Chlorpromazine is a depressant of the nervous system and has been given by RAMANUJAM (p. 833) alone or with potassium antimony tartrate to patients with leprosy complicated by neuritis or pains in various parts. The results were good.

The use of physiotherapy in the sequelae and complications of leprosy is discussed by NÈGRE and FONTAN (p. 579). ILARSHE (p. 1092) uses hypnotic suggestion for the treatment of leprous neuritis, and reports good results.

REZETTE (p. 703) successfully treated perforating ulcers by injecting sodium dehydrocholate intravenously. HODGES (p. 54) describes the surgical treatment of deformities of the foot in leprosy.

Control: Immunization

WARDEKAR (p. 47) gives an account of the work of the Gandhi Memorial Leprosy Foundation in India, under which 10 control units have been established, one of whose duties it is to examine contacts. He raises the question whether bacteriologically negative patients can be infective; if so this would be a further obstacle to control by chemotherapy.

BROWN (p. 52) discusses susceptibility to leprosy, and postulates a heritable factor which influences it. At Culion LARA *et al.* (p. 1200) separated infants at birth from their leprous parents. Some infants were sent away to a non-leprous environment, others were returned to the parents after their lepromin reactions had become positive from BCG or

from repeated lepromin tests, and some are still retained away from the parents but will be returned to them later. These infants are to be watched for the appearance of the disease.

Mitsuda (p. 830) believes that resistance to leprosy can be raised in healthy people by injection of lepromin, and he recommends this for the staff of a leprosarium.

Convit (p. 48) discusses a group of people, with no sign of leprosy, who were given BCG in 1950 and who shared quarters with lepromatous patients. All were Mitsuda negative before the BCG, but almost all became Mitsuda positive. Some were revaccinated. 3 of the vaccinated later showed incipient tuberculoid lesions but there has been no new case since 1953. Schujman (p. 49) reports 40 lepromatous patients who had become clinically and bacteriologically negative after treatment and who were then vaccinated with Stefansky antigen or BCG. This did not induce a positive early (Fernandez) lepromin reaction, but most of them showed a positive late reaction, but only for a short time. The induced lepromin reactivity in lepromatous cases has no protective value.

Pereira and Nery-Guimarães (p. 50) vaccinated healthy monkeys with BCG by various routes, and found that the lepromin and the tuberculin reaction became positive.

Neto *et al.* (p. 445) attempted to convert negative lepromin reactions to positive in lepromatous leprosy, by giving BCG repeatedly by mouth. They suggest that macroscopic reading of the lepromin reaction should be supplemented by histological examination of the point of inoculation. 30 days after injection of lepromin, children who showed no reaction were given BCG (fresh, or after exposure at room temperature for 2 weeks, or killed by heat) by mouth, and the original tests were re-examined 6 weeks later. Some conversion occurred in all (even in controls), but much the most in those given fresh BCG (Bechelli *et al.*, p. 446). In a second experiment the conversions were much more frequent in all categories. After a campaign of BCG vaccination in the Loyalty Islands Lacour (p. 447) found a considerable increase in the proportion of positive lepromin reactions, as well as of tuberculin reactions. Arguing that BCG has a value in raising resistance to leprosy, Campos (p. 704) shows that in one group of leprosy contacts given BCG the proportion of those subsequently contracting lepromatous disease was much less than in a comparable but uninoculated group. Convit (p. 834) observed leprosy contacts who had received BCG, and comparable controls, for up to 5 years, finding considerable evidence of protection in the BCG group.

Rat leprosy

Nakamura (p. 1322) studied the chemical composition of *Myco. leprae-murium* separated from the subcutaneous tissue of the rat by treatment with trypsin. This technique may provide a more specific test antigen than extraction with chloroform. Goulding (p. 178) shows that *Myco. leprae-murium* can remain viable for 6 months when freeze-dried.

Kátó and Gözsy (p. 1201) observed that phagocytosis of BCG in rats and guineapigs was stimulated by antihistamines, but this was not so with rat-leprosy bacilli.

Elek and Hilson (p. 447) describe the evolution of lepromata in the rat. Hadler and Ziti (p. 835) discuss the histological reactions produced by inoculation of *Myco. leprae-murium* into golden hamsters.

The rate of development of corneal lesions in mice after intracorneal inoculation of *Myco. leprae-murium* varies according to the dose; Naguib and Robson (pp. 55, 299) found that cortisone decreased the development of corneal and systemic lesions in such mice, but the liver and spleen contained large numbers of lepra cells filled with bacilli.

Hadler and Ziti (p. 448) discuss the mode of action of DDS in rat leprosy. Chang (p. 836) found that a combination of streptomycin, isoniazid and DDS was more effective in mouse leprosy than these substances alone or in other combinations. Isonicotinoyl-3-methoxy-4-hydroxy-benzal hydrazone shows marked activity in mouse leprosy (Hirano and Sushida, p. 836).

Hanks and Fernandez (p. 178) observed a greater degree of protection against rat leprosy in rats immunized with *Myco. leprae-murium* and BCG (or another non-virulent tubercle bacillus) than in those given the BCG or tubercle bacilli alone. When the specific antigen was included the specific response was increased. Noel and Marie-Suzanne (p. 835) quote experiments which indicate that vaccination with *Myco. marianum* confers some protection against subsequent infection of rats with rat-leprosy bacilli. *Charles Wilcocks*

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

See also p. 1282, Larivière & Abonnenc, Les gites larvaires de Culicidae dans la presqu'île du Cap Vert. [**Breeding Places of Culicidae on the Cape Verde Peninsula**]

Toumanoff, C. Notes sur l'anophélisme dans la Basse-Guinée. [**Anopheline Breeding in Lower Guinea**] *Méd. Trop.* Marseilles. 1958, Mar.–Apr., v. 18, No. 2, 314–39, 14 figs. [29 refs.]

The breeding places of *Anopheles gambiae* and *A. gambiae melas* in the dry season are described in some detail, and are also illustrated by 12 photographs. Larvae of *A. gambiae melas* were found associated with *Avicennia* mangrove swamps and the grass *Paspalum vaginatum*. Larvae

of *A. gambiae* and other *Anopheles* species were found in irrigation canals and other freshwater areas. Both *A. gambiae* and its variety *melas* were found to feed readily on man (93–100% of 288 blood meals identified). In one village 4% out of 42 females dissected contained sporozoites, and in three other villages 2·1% out of 46 females. Only *A. coustani* and *A. obscurus* were captured indoors in addition to *A. gambiae* and *A. gambiae melas*. *B. R. Laurence*

Bellamy, R. E. **An Investigation of the Taxonomic Status of** *Anopheles perplexens* **Ludlow, 1907.** *Ann. Entom. Soc. of America.* 1956, Nov., v. 49, No. 6, 515–29, 6 figs. [Numerous refs.]

"Data are presented which indicate that *Anopheles perplexens* Ludlow, 1907 is a valid species, and it is, therefore, resurrected from the synonymy of *punctipennis* (Say) with which it has generally been confused. While extremely similar morphologically to *punctipennis* in almost all stages, the ova of *perplexens* are strikingly different, the differences as illustrated serving as the most reliable means of separating the two species. A comparison of the chaetotaxy of fourth stage larvae and pupae of *perplexens* and *punctipennis* is made. In fourth instars of *perplexens*, hair 2 on abdominal segments IV and V is predominantly single, but in *punctipennis* is generally branched. Adults of *punctipennis* are larger (longer wings) than *perplexens* on the average, and the light subcostal spot is shown to be relatively reduced in the average wing of *perplexens*. Reliable differences were not detected in a canvass of the mouth parts, forelegs, and hypopygia of representative adults of both sexes of the two species.

"While *punctipennis* is widespread and appears to develop in a considerable variety of temporary and permanent waters, *perplexens* appears to be restricted mainly to limestone springs and the streams that they form. Recognition of the duality of the complex that has masqueraded as *punctipennis* raises certain problems as to the interpretation of various published data on '*punctipennis*', and points the way to further investigation of the ecological, genetic, and geographic relationships of these sibling species."

Hecht, O. & Hernández Corzo, J. Contribución al estudio de los habitos de los anofelinos adultos. 1.—*Anopheles albimanus*, *A. p. pseudopunctipennis* y *A. vestitipennis* en México. [**The Habits of Adult Anophelines. I.** *A. albimanus*, *A. pseudopunctipennis* **and** *A. vestitipennis* **in Mexico**] *Acta Zool. Mexicana.* 1958, Mar. 18, v. 2, No. 6, 1–12. [16 refs.] English summary.

The English summary appended to the paper is as follows:—

"The modern anti-mosquito techniques by means of systematic house spraying with DDT or similar insecticides, and which at present are in

use in anti-malaria campaigns with the view towards eradication of the disease, require, in order to bring full success (the complete interruption of malaria transmission within a given lapse of time), an adequate knowledge of the habits of adult anophelines.

"Up to 1956 the data respecting adult life of *Anopheles albimanus*, considered as the main transmitter in the lowlands of Mexico, were scanty; for example, the resting places where the main part of the gonotrophic cycle takes places were practically unknown. Investigations led to the discovery that it is necessary to take into account the fact that the high roofs thatched with palm leaves of sheds and tropical rural dwellings constitute excellent hiding places for the bloodfilled females, which are concerning malaria transmission the potentially more dangerous part of the anopheline population. The same resting habits have been observed in different places at considerable geographical distance one from the other, i.e. in the States of Guerrero, Veracruz and Yucatan and in the Territory of Quintana Roo.

"As far as *A. pseudopunctipennis* is concerned, the same habits and scheme of activities as described by Bordas & Downs (1951) in the region of Temixco and Acatlipa, Morelos, at 1400 m altitude, were confirmed in Nejapa, Oaxaca, at 800 m. On the other hand, it is stated that in the coastal plains this species shares with the former almost the same habits, among them that the bloodfilled females use the high thatched roofs as resting places.

"A few interesting data on the activities of *A. vestitipennis* gathered at two different places in the State of Veracruz, state that the females of this species used to arrive in the houses between 8 and 10 p.m. in search of their blood nourishment, that they rest temporarily in the interior of the houses and mainly on their outside, where larger numbers of individuals concentrate in the lower third of the walls, and that from there they fly towards dawn to resting places which are yet unknown."

DE ANDRADE, R. M. Observações hidrobiológicas sôbre o *Anopheles tarsimaculatus*: III. Distribuição, freqüência de ocorrência e densidade relativa de organismos planctônicos em alguns de seus biótopos. [**Hydrobiological Observations on *A. tarsimaculatus*. III. Distribution, Frequency and Density of Plankton in Some of its Biotopes**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, July, v. 8, No. 3, 443–90, 1 map. [Numerous refs.] English summary.

[See also this *Bulletin*, 1954, v. 51, 251; 1955, v. 52, 6.]

PEREIRA, J. P. & PAULINI, E. Método turbidimétrico para dosagem de microquantidades de cloroquina. [**Turbidimetric Method of Estimating Micro-Quantities of Chloroquine**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Oct., v. 8, No. 4, 613–15. English summary (9 lines).

ERRATUM

In the abstract of the paper by Clyde and Shute, this *Bulletin*, 1958, v. 55, 982, the last sentence should read:—

"The administration of an antacid simultaneously with the dose of chloroquine hydroxynaphthoate halved the antimalarial efficiency of this salt"—not "doubled" as in the abstract.

Young, E. Melanose door camoquine. [**Melanosis due to Camoquin**] *Nederl. Tijdschr. v. Geneesk.* 1958, June 7, v. 102, No. 23, 1088–92, 7 figs. [10 refs.]

The English summary appended to the paper is as follows:—

"Within a short period, three cases of intensive discoloration of the skin from the use of camoquin were seen in the Department of Dermatology, Utrecht University Hospital. The sclerae of all three patients were yellow as well, and one patient even showed a partial pigmentation of the mucosa (anus and vulva). This discoloration was caused by an abnormally high melanin content, mostly in the epidermis, but also in the cutis. The camoquin itself, as a dye, may have contributed to this peculiar pigmentation."

Schrier, S. L., Kellermeyer, R. W., Carson, P. E., Ickes, C. E. & Alving, A. S. **The Hemolytic Effect of Primaquine. IX. Enzymatic Abnormalities in Primaquine-Sensitive Erythrocytes.** *J. Lab. & Clin. Med.* 1958, July, v. 52, No. 1, 109–17, 3 figs. [25 refs.]

Gökberk, C. **Pyrimethamine.** *Türk Ijiyen ve Tecrübî Biyoloji Dergisi.* Ankara. 1958, v. 18, No. 1, 123–35. [Numerous refs.]

The English summary appended to the paper is as follows:—

"Detailed knowledge about pyrimethamine has been given and it is recommended as a causal prophylactic and suppression with Chloroquine. It has been also pointed out that, as a preliminary report, there are 50 relapse cases up to 20 April 1958, after the first attack year under the Eradication scheme of Malaria in Adana region where 1520 vivax malaria have been seen. All of the cases have been cured with (600 + 300) + (300) + (300) mgr. Nivaquine for 3 consecutive days and suppressed (300) mgr. Nivaquine and 25 mgr. pyrimethamine weekly dose for 6 weeks.

"Pyrimethamine, as a causal prophylactic, has been used, 25 mgr. monthly dose, with success in Çorum and Balikesir regions.

"In both cases no toxic effects have been seen except mild nausea."

Escudié, A. & Abonnenc, E. Sur le comportement de quelques anophèles de la région de Thiès (Sénégal), en zones traitées par les insecticides à effet rémanent. [**Behaviour of Various Anophelines in the Region of Thiès, Senegal, in Areas treated with Residual Insecticides**] *Méd. Trop.* Marseilles. 1958, Mar.–Apr., v. 18, No. 2, 286–303, 2 maps. [26 refs.]

Prior to residual spraying over a wide area—latterly 10,000 sq. km.—in Senegal in 1952 splenomegaly in 2,000 children aged 0 to 14 years was 52% and 22% had parasitaemia. In February 1957 the splenic index was 14·8%, and the parasite index, as low as 1·2% in 1956, had risen again to 16·4%. From 1952 to August 1956, contact insecticides had been applied to houses and animal sheds in various schedules—DDT and gamma BHC once to 4 times per year and, since 1955, DDT once per year. It is considered that 80% of the premises were efficiently treated; 500,000 inhabitants were given protection.

It is shown from studies during the dry season that in certain localities (*e.g.* Pakala, a village near a large marshy area) breeding of *Anopheles gambiae* continues throughout the dry season. It still exhibits the same habits of feeding indiscriminately on man or animal as it did before spraying began, but is only found resting indoors on any available untreated surfaces, surfaces refaced since the previous spraying, or very old treated surfaces. Of the small numbers taken in a 4-month survey, a few were found resting indoors in such circumstances, 1 female with sporozoites in the glands. Others taken were apparently at rest on the outside of buildings, in the vents of a termite mound near the breeding places at the marsh, or coming to bite man out-of-doors or the single horse in the village. [There are apparently no cattle in the survey area.] It is concluded that the apparent exophilic trend in this species is not indicative of a fundamental change in species behaviour but a result of repellence following irritation if the mosquito alights indoors on an insecticide-treated surface. Dispersal in the rainy season of *A. gambiae* from such localized foci favourable for survival and breeding during the dry season is considered sufficient to maintain the level of malaria incidence still found. *A. funestus* was much less in evidence, and taken only out-of-doors; it attacked man. *D. S. Bertram*

Williams, L. L., Jr. **Malaria Eradication—Growth of the Concept and its Application.** *Amer. J. Trop. Med. & Hyg.* 1958, May, v. 7, No. 3, 259–67. [34 refs.]

The history of malaria eradication in the United States starts with a plea made by Hoffman in 1916 for a national effort to this end, which led to the formation of a National Malaria Committee, and ultimately to the formation of the American Society of Tropical Medicine and

Hygiene [see this *Bulletin*, 1952, v. 49, 754]. Hoffman's plea went largely unheeded, most people being imbued with the idea that eradication was impossible, but a few believed in it, including Carter, who worked to that end from the time of Hoffman, and the present author, who in 1943 proposed a programme for malaria eradication to be executed through State and local Health Departments. This proposal came into operation in 1947 and achieved success in 1950.

The tools which were available to workers throughout this history are reviewed from the close personal knowledge and experience of the author, who does not doubt that eradication could have been achieved even without the development of new insecticides, though they were of course fully used and were responsible for the rapidity of success when the task was undertaken.

The author considers that drugs might well be given a higher position in eradication campaigns than is now usual. On the side of organization, much of the initiative has come from the Pan American Sanitary Organization, and the World Health Organization. An integrated international malaria eradication programme was first proposed by Dr. Soper to the 1950 Pan American Sanitary Conference, and the 1954 Conference gave the Bureau a mandate to stimulate national programmes, appropriate money for the purpose and set up an Office of Malaria Eradication. In 1955 the policy was accepted by the World Health Assembly and by the end of 1956 considerable progress had been made in several countries. The general scope of plans throughout the world is encouraging except in Africa, where administrative and technical difficulties have delayed programmes, but the author concludes that the global programme for eradication is not beyond the economy of nations. Inevitably, residual malaria will be found in countries with low economic resources, and it is then just as inevitable that more assistance will flow from the more fortunate nations. *G. Macdonald*

Vargas, L. & Garza de los Santos, A. Los métodos modernos más importantes en la lucha contra los mosquitos. [**The Most Important Current Methods of Mosquito Control**] *Bol. Epidemiológico*. Mexico. 1957, July–Aug.–Sept., v. 21, No. 3, 81–100. English summary.

The English summary appended to the paper is as follows:—

"The AA. discuss the general importance of the ecologic factors as related to mosquito control. They present the chronological development of the most important actual methods of control including commentaries. Synoptic tables are shown on the use of insecticides in the control of arthropods with medical and sanitary importance, presenting at the end a classification of insecticides and giving chemical formulas of the most useful."

Aragão, M. B. Evolução do combate às bromeliáceas que são criadouros de anofelinos. [**Development of the Control of Bromeliads which are Breeding Places of Anophelines**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Oct., v. 8, No. 4, 643–9. [12 refs.] English summary (8 lines).

Ray, A. P. **Haematological Studies in Simian Malaria. Part I. Blood Picture in Normal** *M. mulatta mulatta* **and those infected with** *P. knowlesi* **Infection.** *Indian J. Malariology.* 1957, Dec., v. 11, No. 4, 355–68, graphs 1–4. [25 refs.] **Part II. Blood Picture in Monkeys during Acute and Chronic Stages of** *P. knowlesi* **Infection.** *Ibid.*, 369–88, graphs 5–9. [33 refs.] **Part III. Estimation of Faecal and Urinary Urobilinogen.** *Ibid.*, 389–400, graph 10. [28 refs.]

I. The blood picture has been studied in healthy rhesus monkeys and also during malaria infection while the animals were kept under various dietary regimes. A diet of wheat, fruit or vegetables, adequate in protein content, which was found to cause a rise in haemoglobin in freshly caught animals, was used as a standard. The virulent Nuri strain of *Plasmodium knowlesi*, whose developmental cycle occupies 24 hours, was used in the study of acute infections, 5×10^6 parasitized cells being given intravenously. For the study of chronic infections 10^5 or 10^8 cells parasitized with *P. cynomolgi* were given. Counts on red cells and reticulocytes, as well as determination of packed cell volume, mean corpuscular volume, mean corpuscular haemoglobin, and urinary and faecal urobilinogen were made. Detailed values are given for 32 animals. Death invariably resulted from infection with *P. knowlesi* and as many as 96% of the red cells were sometimes invaded. The haemoglobin values ranged between 7·0 and 13·6 gm. per 100 ml. after some weeks on standard diet. The haematocrit value was 39% and red cells numbered 4·88 millions per cmm. The mean cell volume was calculated as 80 cμ and the mean corpuscular haemoglobin content as 24%. During acute infection the fall in blood haemoglobin approached 50% in 5 days. The anaemia was mainly of normocytic character.

II. During acute and chronic infections with *P. cynomolgi* similar observations to the above were made. The standard diet was used and also one poor in protein consisting of sago, jaggery, sweet potatoes and bananas. A table of findings indicates the relationship between infective dose, intensity of infection and survival rate in 43 rhesus monkeys during acute infection with *P. cynomolgi*. In this relatively benign type of infection a peak occurred 5 to 11 days after inoculation, depending on the number of parasites given. On the standard diet, peak parasitaemia and mortality rate were dependent on the infective dose. The death rate ranged from 30 to 50%, and 8–23% of the red cells were infected. On the poor diet the intensity of infection was reduced by about half while

the mortality rate was higher. The results indicated that the poorer diet retarded parasitic growth. Findings by different authors have not always agreed on this point [this *Bulletin*, 1941, v. 38, 646; 1947, v. 44, 41]. The anaemia was mainly of normocytic character but tended to be of macrocytic type when the quality of the diet was poor. An interesting feature of the blood picture was an enormous rise in reticulocyte count a few days after the peak of infection.

III. The estimation of urinary as well as faecal urobilinogen by standard methods was carried out on about 30 animals since it was felt that examinations of urinary samples alone might indicate a rise from other causes than increased red cell destruction, for example hepatic derangement. The estimations were made at different stages of infection with the two types of malarial parasite, when an adequate diet as well as one low in protein were used. During acute infection there was a significant increase in urinary and faecal urobilinogen independent of the type of diet used. The increase was correlated with increase in parasitaemia, indicating that the cause was mainly due to red cell destruction.

J. D. Fulton

Nakamura, S., Hamada, M., Izutani, T. & Ibusuki, T. [**Experimental Results on Extra Body** *Plasmodium berghei* **with special reference to** *in vitro* **Conservation**] *J. Osaka City Med. Center.* 1958, Jan., v. 7, No. 1, 62–8. [14 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"Regarding extra body Plasmodium berghei, various in vitro conservation methods have been tried following the in vivo human Plasmodium conservation method. It is found that conserved in vitro Plasmodium berghei can survive like in vivo human Plasmodium for a certain period of time.

"On Potzl's method Plasmodium berghei remain capable of infection for 48 hours. On Dattner and Kanders' method they survive for 48 hours. On Horn and Kanders' method I, they survive for 48 hours, demonstrating the ability of infection after 67 hours' conservation. No favorable result has been obtained of Horn and Kanders' methods, II and III."

TRYPANOSOMIASIS

*In this section abstracts are arranged as far as possible in the following order:—*African*—human, animal;* American*—Chagas's disease and other trypanosome infections. In each form the following order is followed:— epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

Glasgow, J. P., Isherwood, F., Lee-Jones, Frances & Weitz, B. **Factors influencing the Staple Food of Tsetse Flies.** *J. Animal Ecology.* 1958, May, v. 27, No. 1, 59–69, 1 fig. [11 refs.]

The purposes of this enquiry were to investigate the diet of both male and female tsetse flies, to compare the diet of males collected on fly rounds [this *Bulletin*, 1957, v. 54, 400] with the diet of resting tsetse flies collected by a new technique [*ibid.*, 1958, v. 55, 132], and to study any changes of host with season or age. The active males of *Glossina swynnertoni* collected on fly rounds contained a greater proportion of older individuals than did the resting male population. Feeds were identified by the precipitin test and the investigation was conducted near Shinyanga, Tanganyika, in an area of thorn bush where game is protected and where *G. swynnertoni* was known to be abundant.

As recorded previously, Suidae, especially warthog and bushpig, were the most important hosts of tsetse flies in all months. Resting females of *G. swynnertoni* took a higher proportion (89%) of their meals from pigs than did resting males (81%); and resting males were found to have taken more meals from pigs than active males (77%). In *G. pallidipes* the proportion of meals taken from Suidae was higher, in both resting females (93%) and males (95%). The relative abundance of game in the area was not recorded but it is believed that the flies seek out the preferred host. Most flies captured in a thicket containing an inhabited warthog burrow had fed on warthog (*G. swynnertoni* 81% of females and 93% of males, *G. pallidipes* 100% of both), but this result was not very different from the general pattern of feeding throughout the area. Only 3 males out of 39 resting *G. swynnertoni* captured in an area covered by giraffe spoor had fed on giraffe, most (28) having fed on warthog. It is emphasized that the general association of fed tsetse flies with any particular animal does not necessarily mean that the flies have used the animal as a host.

The results of these collections are compared with similar collections of tsetse from other districts in Tanganyika and Uganda. In the Singida district of Tanganyika, which is inhabited by *G. morsitans*, 68–72% of the meals were from ruminants, and only 6–8% were from Suidae. Kudu were important here in one area, and buffalo in another. Collections of *G. morsitans* from two areas 20 miles apart in the Ankole district of Uganda showed Suidae as the principal host (67%) in one area; and ruminants (52%) and hippopotamus (25%) as the principal hosts in the other area, with Suidae relatively unimportant (20%). These differences

are presumed to be related to different hosts being available in the different areas, although there is the possibility that the preferences of any one species of tsetse may vary from place to place. *B. R. Laurence*

Harley, J. M. B. **The Availability of *Glossina morsitans* Westw. in Ankole, Uganda.** *Bull. Entom. Res.* 1958, June, v. 49, Pt. 2, 225–8.

Population studies in which a marked-fly method was used were made with a view to comparing the population of *Glossina morsitans* in Ankole, Uganda, with the results in Tanganyika wooded territory as given by Jackson [this *Bulletin*, 1945, v. 42, 186].

Expressed in terms of "standard availability", that is the ratio between the numbers of non-teneral males caught per 10,000 yards and the total population per square mile, the figures of Ankole gave a percentage value with maximum and minimum fiducial limits of 2·0 and 0·19 compared with Jackson's figure of about 10% for Tanganyika.

E. R. Nye

Richet, Lotte & Ducasse. Gravité particulière de la grippe au cours de la récente épidémie chez des trypanosomes en basse Côte-d'Ivoire. [**Special Severity of Influenza among Patients with Trypanosomiasis during a Recent Epidemic in the Ivory Coast**] *Bull. Méd. de l'A.O.F.* Dakar. 1958, Jan.–Mar., v. 3, No. 1, 91–3.

When the influenza epidemic reached the town of Abengourou, Ivory Coast, French West Africa, in September 1957, 131 patients with trypanosomiasis accounted for one-third of the population there. 18 of these contracted influenza and suffered a particularly severe form of influenzal encephalitis which lasted 4 or 5 days in those who recovered, or was fatal between 24 to 48 hours after onset in spite of any form of treatment. 10 of the patients had had arsobal treatment and all of these died; of the 8 patients who had had no trypanocidal drugs 2 died. The severe encephalopathies were apparently related to the trypanosomiasis but were aggravated by previous arsenical treatment. In the otherwise healthy patients who suffered nervous involvement due to the influenza its course was almost invariably benign. *A. R. D. Adams*

Tobie, Eleanor J. & Highman, B., with the technical assistance of H. D. James, Jr. **Failure to demonstrate Cerebral Lesions in Rabbits infected with *Trypanosoma gambiense*.** [Research Notes.] *J. Parasitology.* 1958, June, v. 44, No. 3, 273.

See this *Bulletin*, 1957, v. 54, 141.

Chandler, R. L. **Studies on the Tolerance of N'Dama Cattle to Trypanosomiasis.** Reprinted from *J. Comp. Path. & Therap.* 1958, v. 68, No. 2, 253–60.

Chandler, R. L. **Studies on Cattle protected by Antrycide and exposed to Regular Challenges with Trypanosomes.** Reprinted from *J. Comp. Path. & Therap.* 1958, v. 68, No. 2, 261–3.

Grewal, M. S., David, A. & Chowdhary, D. S. **Preliminary Report of the further Studies on the "so-called" Natural Cryptic (Occult) Trypanosome of the House-Sparrow,** *Passer domesticus* **Linnaeus.** *Indian J. Malariology.* 1957, Dec., v. 11, No. 4, 415–18. [10 refs.]

A trypanosome of sparrows was investigated in India by Jaswant Singh and others [see this *Bulletin*, 1951, v. 48, 878; 1956, v. 53, 161; 1957, v. 54, 797] without finding the adult form of the organism in the vertebrate host. Now this has been done by inoculating large numbers of metacyclic trypanosomes intraperitoneally into (1) a nightingale and (2) a parrot. The infective material was obtained from the gut contents of *Culex fatigans*. Trypanosomes were demonstrable in the bone-marrow of the nightingale 6 days after inoculation, and in the blood of the parrot 4–10 days after inoculation. The trypanosome resembled *T. lewisi*, but had an almost centrally placed nucleus.

Mosquitoes easily became infected (100%) after feeding on an infected bird, the flagellates (including metacyclic trypanosomes) accumulating in the anterior portion of the mid-gut. *P. C. C. Garnham*

Galvão, A. B. Chave illustrada para adultos das espécies brasileiras do gênero *Panstrongylus* Berg, 1879. [**Illustrated Key to the Adults of Brazilian Species of** *Panstrongylus*] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, July, v. 8, No. 3, 421–32, 7 figs. [23 refs.] English summary (2 lines).

Mineiro, V. Contribuição à etiologia do megaesôfago. Distribuição geográfica. [**Contribution to the Aetiology of Megaesophagus**] *Rev. Goiana Med.* 1958, Jan.–Mar., v. 4, No. 1, 29–34.

The English summary appended to the paper is as follows:—

"The author refers to his observations concerning 1,514 cases of megaesophagus, pointing out the fact that, in Brasil, megaesophagus occurs preferentially in some rural regions.

"The author thinks that megaesophagus has no etiologic relations with nutritional deficiencies of rural populations, and that it is rather related

to the Chagas disease. He bases this conclusion on the geographic distribution of endemic areas, on the frequent association of megaesophagus and cardiopathy (with branch bundle block), and on the positivity of Machado-Guerreiro's test in almost all cases of megaesophagus."

Pereira, P. F. & Gonçalves, R. P. Megaesôfago: Hipertrofia ou hiperplasia ? [**Megaesophagus: Hypertrophy or Hyperplasia ?**] *Rev. Goiana Med.* 1958, Jan.–Mar., v. 4, No. 1, 17–28, 6 figs.

The English summary appended to the paper is as follows:—

"The research carried out by the authors show beyond any doubt that in the hypertrophic phase of the chagasic megaesophagus, the absolute number of muscle fibres is increased almost six times in relation to the normal cases.

"The so called 'hypertrophy' of the muscle fibres in megaesophagus does not represent hypertrophy alone, because the number of the muscle fibres is also increased.

"The authors suspect that the increased thickness of the muscle layer of the esophagus obeys the same law for the myocardium, as has been demonstrated by Linzbach. This author had proved that if the human heart does not reach 500 gms. (critical weight), there is hypertrophy only. Above 500 gms. the hypertrophy is always associated with hyperplasia.

"The authors intend to study a larger number of cases of chagasic megaesophagus in order to find the 'critical weight' above which the hyperplasia may be anticipated. They have proved that there is a considerable amount of hyperplasia of muscle fibres in megaesophagus."

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

Lewis, D. J. & Kirk, R. **Some Phlebotominae (Diptera) of the Sudan Republic.** Reprinted from *Ann. & Mag. Nat. Hist.* 1957, Sept., Ser. 12, v. 10, 632–40, 2 figs. [14 refs.]

This paper gives data on *Phlebotomus* of the Sudan collected after the earlier work by the same authors [this *Bulletin*, 1954, v. 51, 1115]. 16 species and varieties are reported from about 10,000 specimens collected; some account is given for several of them of their relative numbers in numerous localities in the Sudan. This is summarized in a table.

P. papatasi is more northern than *P. roubaudi* in its distribution. *P. orientalis*, probably a vector, was again found in a notorious focus of

kala azar—Gallabat—which was abandoned and is now derelict, on account of the disease. This sandfly was biting man. Oiled-paper traps were of little use for catching this species. *P. lesleyae* deserves further study. It resembles *P. argentipes* structurally and is known from several kala azar areas of the Sudan. *P. antennatus* and its varieties make up about half the sandflies caught in the Sudan. A number of species, including *P. clydei*, may be taken in considerable numbers in certain localities only. Sex ratios, in 7 species, varied from 48·1% to 70·6% females.

The following changes are given: *P. subtilis* to be a synonym of *P. tiberiadis*; *P. horgani* (female) to be a synonym of *P. schwetzi* and *P. horgani* (male) a synonym of *P. squamipleuris*; *P. cowlandi* a synonym of *P. bedfordi* var. *congolensis*. A new subspecies, *P. freetownensis furanus* from semi-desert terrain is described. There are numerous line drawings of morphological detail of this subspecies and of *P. roubaudi*, *P. lesleyae* and *P. darlingi*. *D. S. Bertram*

See also p. 1287, Lewis, **Some Phlebotominae from Iran.**

Viana Martins, A., Brener, Z., Mourão, O. G., Lima, M. M., de Souza, M. A. & da Silva, J. E. Calazar autóctone em Minas Gerais. [**Autochthonous Kala Azar in Minas Gerais**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Oct., v. 8, No. 4, 555–63, 4 figs. & 1 map.

The English summary appended to the paper is as follows:—

"There have been reported studies performed on an autochthonous focus of visceral leishmaniasis at Itanhomi (Minas Gerais, Brazil) and ten cases of the disease, in patients from that district and from Governador Valadares, Tarumirim and Conselheiro Pena, have been described. Domiciliary and peridomiciliary captures of phlebotomus have been carried out. The *Phlebotomus longipalpis* seems to be the most important transmissory species."

Viana Martins, A., Barretto, M. P., Brener, Z. & Pellegrino, J. Observações preliminares sôbre um foco de leishmaniose tegumentar americana em Minas Gerais. [**Preliminary Observations on a Focus of Cutaneous Leishmaniasis in Minas Gerais**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Oct., v. 8, No. 4, 577–81, 2 figs.

The English summary appended to the paper is as follows:—

"Investigations performed in an endemic area of muco-cutaneous leishmaniasis in Minas Gerais (Brazil) are reported. The intradermal reaction with *L. brasiliensis* antigens was positive in 21 out of 157 unselected individuals.

"Leishmanial forms were found in seven patients presenting early cutaneous lesions."

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Mac Arthur, W. **The Plague of Athens.** *Bull. History of Med.* 1958, May–June, v. 32, No. 3, 242–6.

Among the various suggestions which have been made to account for the "plague" of Athens recorded by Thucydides, ergotism has been mentioned, and this theory has been revived once more by P. Salway and W. Dell (*Greece & Rome*, 1955, v. 2, 62). These authors take note of Sir William Mac Arthur's argument [this *Bulletin*, 1955, v. 52, 524] that the disease could only have been louse-borne typhus, but they do not accept this view, largely on the ground that if this had been typhus it would not have been an isolated outbreak, and there must have been other epidemics of it in ancient Greece, yet there are no records which would fit such epidemics.

Sir William disposes effectively of this argument by quoting other instances of single records of outbreaks of disease which could not have been unique outbreaks, and thus demonstrating the fact that lack of records does not mean lack of occurrence. Epidemics are soon forgotten in communities where printing is not known and where reports are not organized [a point also made recently by Professor J. N. P. Davies in relation to epidemic diseases in East Africa, *Bull. Hyg.*, 1958, v. 33, 812]. Moreover, the disease as described by Thucydides only slightly resembles ergotism, whereas it fits remarkably well into the picture of typhus, and Sir William reinforces this point by stating that this has been the opinion of all the medical men of extensive experience of typhus with whom he has discussed the matter. The reviewer has no difficulty in accepting this opinion completely. *Charles Wilcocks*

Ruiz-Castañeda, M. **Surface Fixation as a Means of differentiating *Proteus OX19* and *OXK* (Weil-Felix Reaction on Filter Paper).** *Bull. Res. Counc. of Israel.* 1958, June, v. 7E, Nos. 1/2, 118–21, 2 figs.

This paper has previously been published in Spanish. [See this *Bulletin*, 1957, v. 54, 1307.]

Vukasović, P., Borjanović, S. & Martinović, A. Četvorogodišnji rezultati ispitivanja rezistencije *Pediculus humanus corporis* prema insekticidima na endemo-epidemiskim terenima pegavca u NRS. [**The Result of Four Years Investigation of the Resistance of** *Pediculus humanus corporis* **to Insecticides in the Endemo-Epidemic Areas of Typhus Fever in Serbia**] *Higijena*. Belgrade. 1958, v. 10, No. 1, 35–41. French summary.

This study largely confirms the conclusions referred to in a previous preliminary investigation by the authors [this *Bulletin*, 1957, v. 54, 766]. Between 1953 and 1957 over 6,000 lice have been tested in the localities concerned. The percentages resistant to 0·1%, 0·5%, 1·0% and 5·0% DDT are now 15·4, 4·3, 2·4 and 0·9, respectively. The percentages have however varied over the 3 to 4 years' period, but so far no tendency to the emergence of special resistant lines has been observed. The body louse reacts differently from the house-fly and has a different genetic basis of resistance. Also lice are much less mobile and so the dissemination of resistant forms is correspondingly less: furthermore, the development of resistant populations will take time, especially with the irregular use of DDT which is practised at present.

Nevertheless, in crowded centres where people are in close and permanent contact and where unhygienic conditions encourage very great multiplication of lice, the presence of resistant individuals is a real danger in that it holds the possibility of resistant lines developing.

The authors have nothing new to add regarding resistance to BHC and pyrethrins. *H. J. O'D. Burke-Gaffney*

Le Gac, P., Giroud, P. & Colas-Belcour, J. Fixation d'anticorps multiples par des parasites receuillis sur des animaux sauvages et domestiques (rats, lapins, chiens, bovins). [**Fixation of Multiple Antibodies by Parasites collected on Wild and Domestic Animals. (Rats, Rabbits, Dogs and Bovines)**] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 35–8.

In 1952 the authors observed that 74 out of 128 sera collected from domestic animals agglutinated both *Rickettsia conori* and *R. prowazeki* to significant titres [this *Bulletin*, 1952, v. 49, 1106; 1954, v. 51, 902], thus posing the question: are domestic animals reservoirs of epidemic viruses [see also *ibid.*, 1956, v. 53, 736]?

Serum from cases of boutonneuse fever reacted strongly not only with epidemic typhus antigen but also with murine. In some regions the boutonneuse fever syndrome responds to both antigens while in others it responds to murine only. They consider that this is due to two types of virulent elements and that ticks may be considered as "veritable double agents".

In the present work ticks were collected from different animals and tested by a rapid technique for detection of rickettsial infection in the ectoparasites by absorption of specific agglutinins. The sera used were those of epidemic typhus, murine boutonneuse and *R. burneti*. Some of the ticks reacted to only one serum, some to several and some to all four, thus showing that a single vector may possess several antigens. Direct examination of stained smears from the ticks revealed rickettsiae.

P. A. Clearkin

Matsuyama, Y. [**A Synecological Study of Analysis for the Parasitic Larval Fauna of Chigger-Mites (Trombiculidae, Acarina) on the Wood-Mice, *Apodemus speciosus* in Western Kii-Peninsula (Wakayama-Prefecture), Japan**] *J. Osaka City Med. Center*. 1958, Feb., v. 7, No. 2, 73–91, 12 figs. [29 refs.] [In Japanese.] English summary.

Seasonal counts of the Trombiculid and other ectoparasites of wood-mice were made during which 59 animals were examined. Within the Trombiculidae a decrease in numbers was noted in the summer months but affecting the species differently, thus *T. kansai* and *Gahrliepia saduski* were found in small numbers at all seasons.

Among the other groups studied *Laelaps jettmari* was common in summer but scarce otherwise, Ixodidae were collected throughout the year, Glycyphagidae were predominant in the spring but scarce otherwise, while members of the Dermoglyphidae, Cheyletidae and Haematopinidae were scarce at all times.

The study was carried out in 10 localities of the western Kii-Peninsula, Japan.

E. R. Nyé

Roger, F. & Roger, Annie. Nouvelle contribution à l'étude expérimentale des exanthèmes dans les rickettsioses. Leurs conditions de production chez le lapin avec *Rickettsia conori*. Leur relation avec des phénomènes allergiques. [**New Contribution to the Experimental Study of Exanthems in the Rickettsial Infections. Their Conditions of Production in the Rabbit with *Rickettsia conori*. Their Relation to Allergic Phenomena**] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 32–4, 1 fig. on pl.

Inoculation of *Rickettsia conori* in the skin of a rabbit reproduces the *tache noire* so frequently observed in human beings at the site of an infected tick bite but hitherto it has not been possible to reproduce the rash experimentally.

In an endeavour to reproduce the rash two series of rabbits were inoculated with *R. conori*, one in the skin and the other in the peritoneum. The yellow Burgundy rabbit was used on account of its

particular predisposition towards rashes [this *Bulletin*, 1957, v. 54, 156]. Each animal received the equivalent of one vitelline membrane of rickettsia purified by differential centrifugalization and the residue consisting of washed rickettsiae suspended in normal saline.

The animals inoculated in the skin showed a febrile reaction, the temperature rising to at least 40·8°C. on the third, fourth and fifth days, but no rash developed. Those inoculated in the peritoneum showed no febrile reaction but a rash appeared on the fifth day, maculo-papular in type, localized in the upper dorsal region. The following days the numbers of papules progressively increased until the eighth day when the first papules began to show a furfuraceous desquamation. The rash disappeared completely in some 10 days.

The authors consider that the rash is of allergic origin and is due to a different mechanism from that causing fever. All the animals were therefore tested for an allergic reaction by intradermal injection of an antigen purified by Craigie's technique. The tests were performed on the fifteenth day after inoculation, that is to say when the rash had completely disappeared. The animals inoculated in the peritoneum and which developed an exanthem gave a positive reaction, those inoculated in the skin and which developed no rash gave a negative reaction. Thus the rickettsial exanthem is due to an allergic reaction rather than to the rickettsial infection itself. *P. A. Clearkin*

Westra, S. A., Cardozo, E. L. & Ten Berg, J. A. G. De eerste gevallen van Q-koorts in Nederland. [**First Cases of Q Fever in the Netherlands**] *Nederl. Tijdschr. v. Geneesk.* 1958, Jan. 11, v. 102, No. 2, 69–72.

The English summary appended to the paper is as follows:—

"Three cases of Q fever were observed in the last three months of 1956; all these cases occurred in Rotterdam or were acquired in that city. No epidemiological association between these cases could be established."

J. Microbiol., Epidemiol. & Immunobiol. London. 1957, v. 28, Nos. 5/6, 799–815, 5 figs. [23 refs.] [Translated from Russian.]

Q Fever.

Since 1953 much attention has been paid to Q fever in Soviet literature and it has been established that the disease is widespread in the Central Asian republics and in the European part of the U.S.S.R. The present series of papers record studies made in 5 different areas. The general lines of the investigations were similar: surveys were made by the complement-fixation test in sporadic cases and outbreaks, in persons with unexplained fevers, in various occupational groups likely to involve exposure to infection, in healthy persons and in sheep and cattle. The

percentage of positive complement-fixation tests with *Rickettsia burneti* antigen varied within the geographical areas and within the groups of people and animals studied. In all, however, there was evidence of the infection—widespread in some areas—and it was clearly associated with farm animals and their products.

The first paper, by T. A. Bektemirov, P. F. Telenkov, L. I. Kislitsina and A. K. Gritsenko (pp. 799–802), deals with Q Fever in the Chita Oblast, Eastern Siberia, in 1956: the disease had already been detected in Western Siberia. Positive serological results were obtained in 13 of 91 persons with obscure respiratory infections. The Chita oblast is an important cattle-raising area. In all, 648 persons were examined; the percentage of positive serological results in the various occupational groups concerned varied from 6·4% to 15%. These groups included workers in the meat, milk, tanning, wool and felt boot industries. Positive results were also obtained with 5·4% of 110 healthy blood donors, in 6·6% of 259 sheep and in 0·9% of 96 cattle.

V. P. Romanova, I. N. Petrovskii, A. G. Somova, T. A. Nikol'skaia, P. V. Shmatko, A. A. Kosenko, V. I. Balabanova, V. G. Liparskaia, M. A. Kharatiian and E. M. Kompanets (pp. 802–806) studied Q fever in the Kamensk Oblast, in the Rostov region. In the spring of 1956 an outbreak of acute febrile illness attacked 77 people in a village in the area; three-quarters of those affected were cattlemen. The disease was usually benign and all patients recovered, with a protracted convalescence. Sera taken between the 19th and the 45th day, and between the 14th and the 61st day of illness in 10 and 45 patients respectively showed that all of the first group and 36 of the second were positive in complement-fixation tests with *R. burneti* antigen.

Epidemiological data pointed to sheep as a source of infection. In a group of 850 sheep, signs of illness appeared during pregnancy and lambing as about 530 lambs died: many of the delivered ewes were sickly. Positive complement-fixation tests were obtained with the sera of 14 of 75 sheep and 1 of 14 cows. The advent of Q fever seemed to be connected with the arrival of sheep from a district believed to be infected with Q fever. Rickettsiae were not isolated by guineapig inoculation of material from patients and animals nor were they found in the milk of 30 ewes which had lambed 2½ months previously.

The principal cause of human infection would seem to have been contact with sheep during lambing, slaughtering and skinning; a few of the patients were probably infected from the milk of the infected cows.

S. M. Kulagin and R. I. Zubkova (pp. 806–809) investigated Q fever among the population of Moscow. The usual occupational groups were studied. Positive complement-fixation tests were obtained in 6·13% of 473 workers in meat factories, 4·26% of 423 in the milk industry, 22·1% of 158 in the wool industry. Positive results were obtained in the case of 3·72% of 423 blood donors and in 10 of 74 persons with uncertain fevers.

Evidently the disease is present among the general population in Moscow but is rarely recognized clinically: infection probably comes from milk or milk products.

N. I. Fedorova, I. V. Tarasevich, A. I. Sergeeva, E. D. Shliakhturova and L. M. Popova (pp. 809–812) studied Q fever in Dagestan. Among 326 workers from slaughterhouses, milk factories, wool industries and tanneries in a number of towns, 13% gave positive complement-fixation tests. Similar results were found in 7·6% of 73 healthy persons, and 16·5% of 96 persons with febrile illnesses which had been diagnosed as other acute infections. The reaction was positive in 8% of 133 cattle sera. 8 species of ticks capable of carrying *R. burneti* were found and guineapigs were infected with ground suspensions of *Boophilus calcaratus* and *Rhipicephalus bursa*. *Hyalomma plumbeum plumbeum* is also said to be a potential carrier.

R. I. Zubkova, L. E. Okuneva and L. V. Patsko (pp. 812–815) report on Q fever in the Buriat-Mongol A.S.S.R., which is one of the most important cattle-raising areas in the Union and through which herds are driven from the Mongol Republic. Among 1,140 persons of different occupations (which are listed) the highest positive complement-fixation tests were found in cloth workers (21% of 181) and workers in a meat factory (9·5% of 400). Positive results were also found in 4·3% of 436 cows and 4% of 127 sheep. *H. J. O'D. Burke-Gaffney*

Douglas, R. A. **Hepatitis in "Q" Fever with Reports of Four Cases.** *Med. J. Australia.* 1958, May 31, v. 1, No. 22, 739–41. [13 refs.]

"Four cases of 'Q' fever hepatitis are described, in three of which jaundice occurred. These cases were sporadic and did not occur in the course of a human epidemic of the disease. In the three cases associated with jaundice, the mode of presentation made clinical differentiation from infective hepatitis impossible. There was no epidemic of infective hepatitis in the area at the time. Possible differentiating points between the two conditions are discussed."

[See this *Bulletin*, 1957, v. 54, (417).]

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

See also p. 1286, Surtees, **The Production of DDT Resistance in a Southern Nigerian Strain of *Aedes* (*Stegomyia*) *aegypti* under Laboratory Conditions.**

Smith, W. W. & Love, G. J. **Winter and Spring Survival of** *Aedes aegypti* **in Southwestern Georgia.** *Amer. J. Trop. Med. & Hyg.* 1958, May, v. 7, No. 3, 309–11, 1 fig.

A survey in October 1956, at Thomasville, Georgia, revealed *Aëdes aegypti* breeding in 85% of 88 city blocks and in 41·8% of premises inspected. The blocks included business, industrial and residential quarters. As a basis of information for possible control or eradication work against *Aëdes aegypti* in the United States, larval incidence was then assessed weekly from November to June. Although in sheltered places a few larvae persisted with average weekly temperatures as low as 48°F., a weekly average temperature below 60°F. usually killed most larvae. In warmer parts of the winter some adults emerged, but normal breeding and oviposition were not observed until May. *Culex quinquefasciatus* [*C. p. fatigans*] larvae were, on average, in 53% of containers throughout the winter; *C. restuans* predominated in winter, with maximal numbers in March. *C. territans* also occurred in containers from March to May, and a tree-hole breeder, *Aëdes triseriatus*, from December to early May.

D. S. Bertram

Galindo, P. **On the Validity of** *Haemagogus spegazzinii falco* **Kumm** *et al*, **1946 (Diptera, Culicidae).** Reprinted from *Proc. Entom. Soc. of Washington.* 1957, June, v. 59, No. 3, 121–4, 5 figs. on pl.

The author, after studying types and much other material, concludes that *H. s. falco* and *Haemagogus spegazzinii spegazzinii* are valid names for the forms of this species in, respectively, the western regions of Venezuela and Colombia north to Honduras; and the regions of northern Argentina and Bolivia through eastern Brazil to French Guiana. There is a zone of intergrading forms in north-central Brazil, most of the Guiana territories, Venezuela and Trinidad. The last locality is the type locality for *H. janthinomys*. It is concluded that this form is not of specific rank and that the name should be set aside in the synonymy of *H. s. spegazzinii*, which it resembles more closely than *H. s. falco*.

D. S. Bertram

Galindo, P., Trapido, H., Carpenter, S. J. & Blanton, F. S. **The Abundance Cycles of Arboreal Mosquitoes during Six Years at a Sylvan Yellow Fever Locality in Panama.** *Ann. Entom. Soc. of America.* 1956, Nov., v. 49, No. 6, 543–7, 1 fig.

Six years' collecting of arboreal mosquitoes at Cerro La Victoria, 15 miles east of the Panama Canal, has shown that the abundance of 5 species of mosquito concerned with the transmission of yellow fever in the area varied greatly from year to year. The monthly rainfall in the area, which is intermediate between tropical rain forest and deciduous forest, also varied greatly from year to year, and the critical period for the

maintenance of the yellow fever transmission cycle is the dry season, January to April. All five species of mosquito, *Haemagogus equinus*, *H. lucifer*, *H. spegazzinii falco*, *Aëdes leucocelaenus clarki* and *Sabethes chloropterus*, breed in treeholes and treehole breeding is obviously affected by rainfall. In four dry seasons *H. spegazzinii* and *A. leucocelaenus* were completely absent. *H. equinus* and *H. lucifer* were present at very low densities in each month in one year or another, but were not present during every month of any one dry season. These species lay eggs that are resistant to desiccation. Adults of *Sabethes chloropterus* were found in every month of the dry season in one year, and in 2 or 3 months of the dry season in 3 other years. The eggs of this species are not resistant to desiccation, but the females lay preferentially in treeholes with small apertures [this *Bulletin*, 1951, v. 48, 802].

The authors believe that there is enough variation in the mosquito population over the four-month dry season so that some of the vector species in some years are present as adults in each month. In the dry season also the mosquitoes, especially *Sabethes*, tend to become less strictly arboreal and bite more frequently nearer the ground.

B. R. Laurence

GALINDO, P. **A Note on the Oviposition Behavior of** *Sabethes* **(*Sabethoides chloropterus* Humboldt.** Reprinted from *Proc. Entom. Soc. of Washington.* 1957, Dec., v. 59, No. 6, 287–8.

Several species of sabethine mosquitoes in Panama are found breeding in bamboo stems, with only small holes in the wall drilled by boring insects [this *Bulletin*, 1951, v. 48, 802]. This paper describes how female *Sabethes chloropterus* eject, while on the wing, eggs from the tip of the abdomen through a hole measuring one-quarter of an inch in a bamboo cane into water in its hollow interior. The force of ejection is sufficient to propel the eggs in a straight horizontal line for a distance as great as 10 cm. A further paper is in preparation describing the method used in keeping a colony of this species for 2 years in the laboratory.

D. S. Bertram

DENGUE AND ALLIED FEVERS

DERRICK, E. H. & BICKS, Valerie A. **The Limiting Temperature for the Transmission of Dengue.** *Australasian Ann. of Med.* 1958, May, v. 7, No. 2, 102–7, 4 figs. [17 refs.]

In studies on the geographical limits of outbreaks of dengue in Australia an approximate correlation was found between the southernmost limits of the outbreak and the wet-bulb isotherms between 14° to 15°C. The use of the wet-bulb thermometer readings was justified on the ground

that it made allowance for the humidity factor which influenced the distribution of *Aëdes aegypti*. The 14·2°C. isotherm for July was shown as including most of the continent's northern coastline and therefore providing the possible background for outbreaks of dengue throughout the year. The annual isotherm extends from Harvey to Sydney, roughly marking out the southernmost limit of spread of the epidemics except for the special conditions in the arid interior of the continent. It is considered that the failure of the disease to be endemic in the northern region may be due to lack of large population groups in excess of 50,000.

Mention is also made of the presence of *Aëdes scutellaris* at Cape York and around Darwin and its importance as a possible vector. *E. R. Nye*

RABIES

Depoux, R. & Orio, J. Deuxième note sur la réaction de fixation du complément dans le diagnostic de la rage. [**Complement-Fixation Reaction in the Diagnosis of Rabies. Second Note**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 157–9.

The following is a translation of the authors' summary:—

A new method (Giacosa de Crescini, *Rev. de Med. Vet.*, 1955, v. 37, 263) of preparing a rabies antigen for the complement-fixation reaction not having proved reliable in the case of street rabies, it cannot be used for the diagnosis of this disease in a suspect animal.

[See also this *Bulletin*, 1956, v. 53, 878.]

H. J. O'D. Burke-Gaffney

Veeraraghavan, N. & Balasubramanian, A. **A Comparative Study of the Antigenic Value of 5 per cent Semple Vaccine prepared in Distilled Water and Normal Saline.** *Indian J. Med. Res.* 1958, May, v. 46, No. 3, 514–17.

"Under the conditions of the experiments described it has not been possible to demonstrate that vaccine prepared in distilled water immunizes more quickly and gives better protection in the post-infection treatment of animals, compared with the vaccine prepared in normal saline."

[See this *Bulletin*, 1955, v. 52, 151.]

Veeraraghavan, N. & Subarahmanyan, T. P. **The Value of 5 per cent Semple Vaccine prepared in Distilled Water in Human Treatment: Comparative Mortality among the Treated and Untreated.** *Indian J. Med. Res.* 1958, May, v. 46, No. 3, 518–24.

"As stated earlier the incidence of post-treatment complications among patients treated with 5 per cent Semple vaccine prepared in distilled water

was nearly five times greater than that among persons treated with vaccine prepared in normal saline. It is possible that this was a coincidence. But, the absence of such a high incidence before the issue of the vaccine and after its discontinuance is against such a possibility.

"The number of groups investigated is admittedly small. Nevertheless, the results do not appear to be strikingly different from those obtained among persons treated with vaccine prepared in normal saline. These findings indicate that the substitution of distilled water for normal saline in the preparation of vaccine does not *per se* improve its antigenicity."

COONOOR. **The Pasteur Institute of Southern India, Coonoor. Section B. Scientific Report 1957. I. Rabies. B. Studies on Antirabies Serum** [VEERARAGHAVAN, N., SUBRAHMANYAN, T. P., RANGASAMI, R. & KULLA, A.]. pp. 44–60. 1958. Madras: Diocesan Press.

Commercial rabies antiserum gave no protection in a group of 10 guineapigs when injected locally 1 hour after infection, but an antiserum to the same strain of virus gave considerable protection under the same conditions, the mortality being 3 of 9 animals, compared with 8 of 10 in an untreated control group. The mortality was considerably higher in similar experiments in which the animals were also treated with homologous vaccine for 7 days, and a reaction was evidently taking place between vaccine and antiserum. Cross-protection tests in guineapigs infected with 5 strains of rabies virus and treated with 5 different antisera showed that the highest degree of protection could only be obtained with homologous antiserum. Neutralized virus-antiserum mixtures could not be dissociated by inoculation immediately after mixing, by dilution, or by treatment of the animals with cortisone. The protection conferred by combined treatment with vaccine and antiserum was investigated in guineapigs, and it was found that the optimum dose of antiserum depended on the dose of vaccine given and also on its antigenicity. Very little protection was conferred by antiserum and vaccine mixed before injection.

D. J. Bauer

CORCOS, A. Début d'un érythème noueux au point de morsure après vaccination antirabique. [**Erythema Nodosum beginning at the Site of a Bite after Antirabies Vaccination**] *Bull. Soc. Path. Exot.* 1957, Nov.–Dec., v. 50, No. 6, 886–8.

A child of 11 was bitten by a dog on the right calf and given antirabies vaccine for a week. The vaccine was stopped when it was shown that the dog was not rabid. 15 days later, pain and swelling occurred at the site of the bite and the next day an erysipeloid plaque, about the size of the palm of a small hand, developed on the same site. Small red nodules appeared on various parts of the limbs at the same time. A patch test

was done: the next day a little red induration occurred at the injection site, the temperature rose and the day after several new nodules appeared on the limbs. The patch test [details not given] was + +. The original lesions diminished, but despite this and streptomycin-isoniazid treatment, the pyrexia persisted for 10 days. X-ray of the lungs showed only slight hilar adenopathy. Recovery was complete.

The author adds that he has also seen erythema nodosum in a woman of 31, which began as a transitory red swelling in the scar of an appendicectomy.

These would appear to be focal reactions at the site of previous traumatism. *H. J. O'D. Burke-Gaffney*

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

Girard, G. Antagonisme exercé vis-à-vis de *Pasteurella pestis* par des souches de *Streptococcus*, *in vivo* et *in vitro*. [**Antagonism to *Pasteurella pestis* by Strains of Streptococci *in vivo* and *in vitro***] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 18–22, 1 fig. on pl.

In bubonic plague the presence of pyogenic organisms in the buboes coincides with disappearance of *Pasteurella pestis*. Experiments in animals confirm the findings in human plague.

During routine virulence tests in mice of strain EV of *P. pestis* used for preparing a living attenuated vaccine, animals which survived 30 days were killed. At the site of the inoculation there was a suppurative adenitis which yielded either *P. pestis*, a Gram-positive coccus or, exceptionally, both on culture if the incubation temperature did not exceed 26°C. Similar organisms were isolated from a nodule in the skin of guineapigs during the course of inoculations to exalt the virulence of old stocks of *P. pestis*. They were in pairs or chains and appeared to be a variety of streptococcus. A colleague identified them as *Str. sanguis* and *Str. mitis*.

Simultaneous culture and incubation at 37°C. of *P. pestis* and *Str. sanguis* or *mitis* resulted in rapid growth of the streptococci. *P. pestis* could not be recovered after 24 hours unless it was heavily inoculated, but if some of the *P. pestis* retained their vitality for 48 hours and the cultures were then maintained at room temperature or even in the refrigerator the *P. pestis* increased and streptococci disappeared.

These streptococci which did not survive more than 2 to 3 weeks in pure culture in broth survived several months in symbiosis with *P. pestis*

as if these organisms supplied them with elements necessary for their integrity and vitality.

The experiments were repeated with both virulent and avriulent strains of *P. pestis* with identical results.

The antagonism is rendered more evident by touching the centre of a culture of *P. pestis* on an agar slope with a trace of a culture of the streptococci. Around the site of contact growth of *P. pestis* is inhibited as shown by a zone of growth of streptococci 5 to 10 mm. in diameter contrasting strongly with the surrounding *P. pestis*.

The inhibiting factor in the streptococcus is not a bacteriophage. Filtrates are without effect on growth of *P. pestis*.

That the inhibitory effect is exercised also *in vivo* was shown in a guineapig dead from acute plague. The spleen swarmed with *P. pestis* but the lung showed very rare *P. pestis* but numerous *Str. mitis*, thus showing their inhibitory effect *in vivo*.

P. A. Clearkin

Ajl, S. J., Rust, J., Jr., Hunter, D., Woebke, Jeanette & Bent, D. F. **Preparation of Serologically Homogeneous Plague Murine Toxin and its Reactions with Physical, Chemical and Enzymatic Agents.** *J. Immunology*. 1958, June, v. 80, No. 6, 435–40, 1 fig. [10 refs.]

Pasteurella pestis (Tjiwidej) toxin, which had been precipitated from autolysed cultures with ammonium sulphate between 35% and 70% saturation, was further purified by fractionation in a continuous-flow paper electrophoresis apparatus developed by Spivack and Karler [below]. A sequence of 4 runs (2 in veronal buffer at *p*H 8·6 followed by 2 in maleate buffer at *p*H 6·0) yielded a fraction containing 3% of the original total protein with an intraperitoneal LD50 of 0·7 μgm. and an intravenous LD50 of 0·2 μgm. for mice, representing 17-fold purification. This fraction gave a single precipitation band when tested against whole cell antiserum by the Oudin gel technique and against monospecific antiserum (prepared by immunizing rabbits with the fraction itself) by the Ouchterlony technique. Enzymatic treatment of the purified toxin did not markedly affect its toxic or serological activity although a considerable liberation of free amino-acids occurred, suggesting that not all of the molecular substances present were actually involved in the toxicity of the preparation. "These preparations of plague murine toxin are nevertheless the purest ones that are currently available."

R. S. F. Hennessey

Spivack, M. L. & Karler, A. **Purification of the Toxin of *Pasteurella pestis* by Continuous-Flow Paper Electrophoresis.** *J. Immunology*. 1958, June, v. 80, No. 6, 441–5, 3 figs. [11 refs.]

This paper gives details of the continuous-flow paper electrophoresis method [see above] as applied to the separation of *Pasteurella pestis*

toxin from extracts obtained by ammonium sulphate fractionation of the virulent strain 195/P. The extracts were dissolved in barbital buffer at *p*H 8·6 for electrophoresis. A purification factor of approximately 14 was achieved, representing a 30–40-fold increase in activity over that present in the crude toxin before ammonium sulphate treatment. The number of antigens detectable by the Oudin gel technique was reduced from 8–10 in partially purified material to 3 in the final product, which had a mouse LD50 (intravenous) of 0·1–0·3 μgm. Toxin showing a single antigenic component was obtained by recycling material from the most mobile fraction; the specific activity of the toxin containing the single component was no greater than that of the product containing the 3 components, indicating that the 2 contaminating components were present in low concentration. Similar results were obtained with toxin from the attenuated strain EV 76. *R. S. F. Hennessey*

Kartman, L., Prince, F. M. & Quan, S. F. **Studies on** *Pasteurella pestis* **in Fleas. VII. The Plague-Vector Efficiency of** *Hystrichopsylla linsdalei* **compared with** *Xenopsylla cheopis* **under Experimental Conditions.** *Amer. J. Trop. Med. & Hyg.* 1958, May, v. 7, No. 3, 317–22, 1 fig.

Hystrichopsylla linsdalei is thought to be a primary vector of plague to voles and field mice in San Francisco Bay region where plague epizootics occur [this *Bulletin*, 1958, v. 55, 763]. Its efficiency is compared with that of *Xenopsylla cheopis* in this paper. The plague vector index [see this *Bulletin*, 1957, v. 54, 32 and 678] for male and female *H. linsdalei* combined was 0·002 and for *X. cheopis* 0·03. The lower efficiency of the former is attributed at least in part to the fact that only about 20% of *H. linsdalei* became blocked, while the proportion of *X. cheopis* blocking over the same period (up to 40 days from initial infection) was nearly 60%. Moreover, blocked *H. linsdalei* lived only 1 day, but *X. cheopis* for 3 days. There appear to be specific physiological differences between the fleas in their capacity to allow bacterial multiplication in the gut. Mice bitten by *H. linsdalei* died in about 5 days, those infected by *X. cheopis* in about 4 days, suggesting different infecting doses of bacilli transmitted. *D. S. Bertram*

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

De, S. N., Lahiri Choudhury, P. K., Ghose, M. L. & Mondal, A. **A Study of the Technique for Demonstration of "O" and "H" Agglutinins in the Serum of Cholera Patients.** *Indian J. Med. Res.* 1958, May, v. 46, No. 3, 351–8. [10 refs.]

Bacteriological diagnosis of cholera is not always satisfactory but serological diagnosis might be of some use for retrospective diagnosis and for epidemiological purposes. This study was therefore made to ascertain if H and O agglutinins could be detected in the serum of cholera patients.

50 samples of blood were taken between the 5th and 7th day of the disease in bacteriologically confirmed cases of cholera and tested for agglutinins against *Vibrio cholerae* and 6 other intestinal organisms. Four separate cholera suspensions were used as antigen: (1) saline suspension of living cholera vibrios, (2) saline suspension of an agar culture of a non-agglutinating vibrio possessing the same H antigen as *V. cholerae* but a different O antigen, (3) formalin broth culture of *V. cholerae*, (4) formalin broth culture of the non-agglutinating vibrio described. With the slide method none of the 50 sera agglutinated any of the intestinal organisms but agglutinated *V. cholerae*. With the Dreyer's tube technique all 4 antigens showed 5 different types of agglutination.

It is concluded that incubation for 4 hours at 37°C. of a living suspension of cholera vibrios and overnight incubation at 56°C. of a formalin broth culture of a non-agglutinating vibrio having the same H antigen but different O antigen as the cholera vibrio, with dilutions of the patient's serum, appear to be the best methods of detecting H and O antibodies by agglutination.

P. A. Clearkin

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Silva, R., Donckaster, R. & Valencia, R. Estudio de algunos factores epidemiológicos que favorecerian la infección y reinfección por *Entamoeba histolytica*. [**Study of some Epidemiological Factors favouring Infection and Reinfection by** *Entamoeba histolytica*] *Bol. Chileno de Parasit.* 1958, Apr.–June, v. 13, No. 2, 22–5. [12 refs.]

The English summary appended to the paper is as follows:—

"After treating 93 cases of chronic intestinal amebiasis with Tetra-

cycline or Chloroquine-Bismuth Glycolyl arsanilate only 38 individuals remained negative for *E. histolytica*. Since reinfection appears to play an important role, this failure cannot be attributed solely to the drugs. Thus, an epidemiological survey showed gross carelessness in personal hygiene and poor home sanitation amongst those patients with persistent *E. histolytica* infection."

Quattrocchi, G. Un singolare caso di colite amebica con fistolizzazione in pleura. [**A Case of Amoebic Colitis with Fistula into the Pleura**] *Giorn. di Malattie Infettive e Parassit.* 1958, July, v. 10, No. 7, 551–5, 3 figs.

Cooper, J., Sprogis, G. R., Heinemann, Margaret & Feirer, G. M. **Therapy of Amebiasis Carriers with Oleandomycin-Tetracycline (Signemycin).** *Antibiotic Med.* New York. 1958, May, v. 5, No. 5, 302–4.

Signemycin is put up in 250 mgm. capsules, which contain 33% oleandomycin and 67% tetracycline. 50 male mentally defective (institutional) patients with asymptomatic amoebiasis, diagnosed by stool examination, were given 3 capsules (750 mgm.) of the preparation orally twice daily for 10 days. The stools were examined on days 3, 6 and 9 of treatment, and subsequently on days 23, 43, 46 and 51. Of the 50 patients treated, 48 became stool-negative within 48 hours, and the other 2 by the sixth day of treatment; 4 subsequently became stool positive again. The "cure rate" is therefore considered to be 92% in this series; the drug caused no side effects or inconveniences.

A. R. D. Adams

Brooke, M. M., Heeren, R. H., Sawyer, Grace M. & Stoner, Dorthea. **Mass Therapy in Attempted Control of Amebiasis in a Mental Institution.** *Pub. Health Rep.* Wash. 1958, June, v. 73, No. 6, 499–510, 3 figs. [10 refs.]

"In an institution of approximately 1,600 mentally deficient patients living in 8 separate buildings, examination of single stool specimens from 667 individuals indicated that at least 29 percent harbored *Entamoeba histolytica*. Prevalence rates ranged from 7 to 64 percent from building to building.

"Preliminary tests of mass therapy in the building with the highest prevalence of *E. histolytica* showed that single courses of oxytetracycline did not eradicate all infections and that the incidence of infection rose to one-half of the pretreatment level by the end of 6 months.

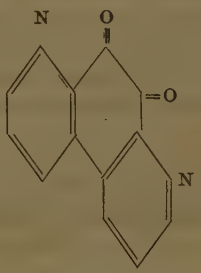
"When mass therapy was extended to the entire institution, each patient was given 1 of 4 drug regimens—carbarsone, iodochlorhydroxyquin, oxytetracycline, and a combination of oxytetracycline and carbarsone

—on 2 occasions 6 months apart. On the second occasion, the drug was changed for each person. Results of examinations performed 6 months after each medication indicated that mass therapy was successful in reducing the prevalence of *E. histolytica* in 7 of the 8 buildings but that the species apparently was ' eliminated ' in only 3 buildings. The effectiveness of therapy appeared to be related to the prevalence rate of *E. histolytica* in each building prior to medication and to the general level of personal hygiene of the patients.

" No significant differences were observed in the relative effectiveness of the four drug regimens against *E. histolytica*. However, since the study was primarily concerned with control of infections and was not specifically designed for the evaluation of drugs, this result cannot be taken as conclusive."

KRADOLFER, F. & NEIPP, L. **Experimental Studies on Amebicidal, Antibacterial, and Antiparasitic Phenanthroline Compounds.** *Antibiotics & Chemotherapy*. New York. 1958, June, v. 8, No. 6, 297–308, 3 figs. [18 refs.]

The amoebicidal and other properties of 4,7-phenanthrolene-5,6-quinone (PQ) and of its semicarbazone (PQS) have been tested *in vitro* and *in vivo*. The following is the construction of the parent substance.



The culture of *Entamoeba histolytica* used was accompanied by a mixed bacterial flora and the drugs at the correct concentration were dissolved in the upper layer of a diphasic medium, which consisted of 15% horse serum in Ringer's solution. A volume of this material was mixed with an equal volume of sediment containing amoebae, from a 3-day culture, on a glass slide and sealed off by a coverslip. After 24 hours' incubation at 37°C. the preparations were examined microscopically and compared with controls. The effect of the drugs on the accompanying bacteria was also considered, and also on *Trichomonas foetus* in culture. *In vivo* amoebicidal tests were made on rats and guineapigs [this *Bulletin*, 1947, v. 44, 313; 1952, v. 49, 1046]. The amoebicidal titres of intestinal contents, of urine and of bile were determined at stated intervals after

drug administration. In the rat the number of coliform bacteria in the gut was apparently increased after dosage with the drugs for 14 days. *In vitro* PQ appeared to be as active as emetine against *E. histolytica* and had some action against Gram-positive and Gram-negative bacteria. The two substances were also active against *E. histolytica* infections in rats and guineapigs at a safe dosage; also against Trichomonads in hamsters and pinworms in mice. PQ is excreted in an active form in bile and urine. The value of the substance was also proved in preliminary clinical trials in amoebic infections of man. The mode of action of the substances has not yet been elucidated. *J. D. Fulton*

Ganapathy, M. S. & Alwar, V. S. **Amoebic Dysentery in Dogs. (A Case Report.)** Reprinted from *Indian Vet. J.* 1957, Nov., v. 34, No. 6, 427–30, 4 figs. on pl.

A case in Madras.

Rogova, L. I. [**On** *Entamoeba moshkowskii*] *Med. Parasit. & Parasitic Dis.* Moscow. 1958, v. 27, No. 3, 330–34. [12 refs.] [In Russian.]

The English summary appended to the paper is as follows:—

"Entamoeba moshkowskii is widespread in the irrigation channels of Tashkent and may be easily detected by the method of cultivation. This amoeba is unable to exist in the intestines of man and animals. Not a single guinea pig became infected with E. moshkowskii out of 10 to which it was introduced into the caecum. In a control group of animals which were infected in the same way with Entamoeba histolytica 6 contracted the disease. Inoculation of media with four-nuclear cysts from the feces of 50 healthy carriers at room temperature did not give a single case of growth of E. moshkowskii; development of E. histolytica took place in 45 cultures out of the same feces of these 50 cases when the tubes were kept at 37°C. Numerous attempts to infect 2 volunteers (physicians) by swallowing the cysts of E. moshkowskii were of no avail. Even transitory cysts could not be detected."

Červa, L. & Větrovská, G. K otázce pathogenity bičíkovce *Chilomastix mesnili*. [**The Pathogenicity of the Flagellate** *Chilomastix mesnili*] *Československ. Epidemiol., Mikrobiol., Imunol.* Prague. 1958, v. 7, No. 2, 126–35, 2 graphs. [21 refs.] English summary.

A parasitological investigation has been made on 60 children aged 1–3 years living in an institution in Prague, who had been suffering from frequent attacks of diarrhoea. These came in waves with intervals of

1–2 days, with 4–10 fluid stools per day; the temperature was not raised and the general condition was unaffected. Bacteriological examinations of the stools gave negative results, and the condition did not respond to sulphaguanidine or chloramphenicol. Protozoological examinations of 59 children showed the presence of *Chilomastix mesnili* in 24 (40%), *Entamoeba coli* in 18 (30%) and *Giardia intestinalis* in 12 (20%) instances, and *Trichomonas hominis*, *Endolimax nana* and *E. histolytica* form *minuta* were found less frequently. No protozoa were found in 15 (25%) children. It was considered that the condition was due to *C. mesnili*, and marked improvement and gain in weight occurred after treatment with carbarsone. *D. J. Bauer*

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Zumpt, F. **A Preliminary Survey of the Distribution and Host Specificity of Ticks (Ixodoidea) in the Bechuanaland Protectorate.** *Bull. Entom. Res.* 1958, June, v. 49, Pt. 2, 201–23, 4 maps. [23 refs.]

This paper is a list of 21 species of ticks, with their general distribution in certain villages in Bechuanaland, the hosts on which they were found, and a short general statement of each species' economic importance. The distributions of *Ornithodorus moubata*, *Rhipicephalus sanguineus* and *Amblyomma hebraeum* are shown by maps. Specimens of *O. moubata* infected with *Spirochaeta duttoni* were obtained in one village and there is also a record of nymphs of this species collected from a pangolin (*Smutsia*). *O. savignyi* appears to be uncommon and is recorded from one village only near the southern border of Bechuanaland.

B. R. Laurence

Haneveld, G. T. Sodoku ten gevolge van een muizebeet. [**Rat-Bite Fever caused by a Mouse**] *Nederl. Tijdschr. v. Geneesk.* 1958, May 31, v. 102, No. 22, 1030–32. [21 refs.]

The English summary appended to the paper is as follows:—

"A man, aged 27, developed rat-bite fever (Sodoku) four weeks after being bitten in the little finger by a small grey mouse. The clinical symptoms and blood picture were similar to those of the Spirillum minus infections already described, but serological confirmation could not be obtained. Treatment with long-acting penicillin (Bicillin and Depocillin, altogether 1,300,000 units) caused a short reaction of fever (102·2°F) and severe headache seven hours after the first injection (probably Herxheimer reaction).

"Mice have very rarely been mentioned as vectors in rat-bite fever."

YAWS AND OTHER TREPONEMATOSES

GENTLE, G. H. K. **The Significance of Asymptomatic Serum-Positivity in Trinidad and Tobago with special reference to Yaws.** *West Indian Med. J.* 1957, Dec., v. 6, No. 4, 217–24, 1 fig.

Yaws was introduced into Trinidad very many years ago; of 27,231 blood specimens examined in 1944, 26·3% gave a positive reaction to serum tests for syphilis; how many of these were due to yaws or syphilis or other conditions is not known.

There are 14 areas in the island where yaws is endemic. A yaws campaign was started in 1947 and from then until 1953 the percentage of yaws cases diagnosed in all applicants fell from 17·0 to 4·5.

In order to differentiate latent yaws from latent syphilis reliance was placed on place of birth and domicile, history, clinical findings, negative cerebrospinal fluid, and investigation of family and sexual partners; other conditions likely to give false positive reaction were excluded.

Figures for the years 1948–1956 show the relative figures for syphilis and yaws; in 1956, 396 patients were diagnosed as having latent yaws and 419 latent syphilis. The Kahn universal reaction was found to be of no value in distinguishing between the two diseases.

In Tobago the percentage of patients with yaws fell from 84·0 in 1947 to 9·2 in 1956 [though no explanation of this is given]. Of 230 patients who came to Trinidad from Tobago 164 (70%) were diagnosed as yaws and 66 (30%) as syphilis; of the former 13 were early and 151 latent; of the latter 2 were early, 13 tertiary, 1 congenital, 13 early latent and 37 late latent.

The problem still remains unsolved though presumably yaws campaigns, including treatment, have brought about a decline in the incidence of the disease. *T. E. Osmond*

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

VOGELSANG, T. M. **The Termination of Leprosy in Norway. An Important Chapter in Norwegian Medical History; together with a Portrait of Armauer Hansen Circa 1873.** *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 345–50, 1 fig. on pl.

Leprosy was a very old disease in Norway, where it may have been imported from Great Britain by the Vikings. The best-known Norwegian

leprosarium is in Bergen, St. Jörgen hospital, founded about 1400 A.D. From 1817 there was a physician attached to this hospital, but it was not till the coming of DANIELSSEN, and his collaboration with BOECK in the monograph on leprosy, *Om Spedalskhed* in 1847, that leprosy was seriously studied. In 1856 there were about 3,000 cases of leprosy in a population of 1,300,000. It was largely due to Armauer HANSEN's discovery of the bacillus, and the Norwegian leprosy Act of 1877, amended in 1885, that leprosy declined from 1,752 in 1875 to 7 in 1957. The last physician of the St. Jörgen hospital resigned in 1957 as his office had become superfluous. A photograph of Hansen, at the age of 32, in the year 1873 when he discovered the bacillus, is attached.

[See also this *Bulletin*, 1957, v. 54, 965 *bis*.] *Ernest Muir*

DAVEY, T. F. **Decline of Leprosy in a Group of Nigerian Villages between 1941 and 1956.** *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 329–44, 1 fig. [10 refs.]

A group of villages in the Eastern Region of Nigeria is described. In 1941 a survey was made in which 3,057 people, forming 99% of the population, were examined, and a prevalence of leprosy of 121 per 1,000 was found. The low proportion of frank lepromatous cases was of interest, as " Although they constituted only 8·8 per cent of the total cases, they nevertheless represented 9 per mille of the population ". In 1947 the prevalence had fallen to 76 per 1,000, and in 1955 to 17 per 1,000.

First the reasons for the increase of leprosy in the district are discussed. This was due to fresh infections, to the developing of leprosy in those already infected, to new patients coming from outside the area, and to those who had gone abroad returning with the disease.

Then the reasons for diminution of the disease are discussed. These are 5 in number. (1) Mortality of leprosy patients: this was particularly high to begin with, chiefly because patients who were severely infected had lost the desire to live. (2) Removal of patients from the area: this accounted for very few. (3) Immunological factors: there is no evidence, although a special tuberculin survey was done, that the decline in leprosy can have been caused by cross immunity to tuberculosis. Increased resistance to *Myco. leprae*, after a large-scale lepromin testing in 1957, " does not commend itself as a fact or of any real significance in the decline of leprosy ". (4) Public and personal hygiene: while there have been some improvements in this direction, the prevalence of yaws and scabies today indicates that advances in hygiene are not enough to account for the decline in leprosy from 1944 onwards. (5) Public control measures: during the period from 1941 to 1951, when the greatest decrease occurred, the treatment was with hydnocarpus oil, and it is considered that " its therapeutic action . . . contributed little or nothing to the decline of leprosy. Indirectly, however, its effect was considerable ".

Indeterminate cases, which when untreated frequently turn into lepromatous, generally resolved under hydnocarpus treatment. The most important factor, however, in bringing about the decline of the disease was the segregation village where everything was done to make life more acceptable than at home, from which all healthy people were strictly excluded, while open cases were removed from overcrowded communities. Also the examination of contacts, follow-up of discharged patients and newcomers to the district, and periodic surveys maintained public concern regarding the disease. *Ernest Muir*

Nishiura, M., Harada, N. & Imaeda, T. **Electron Microscopy of Ultra-Thin Sections of Lepromatous Peripheral Nerves.** *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 323–8, 8 figs. on 5 pls. [10 refs.]

With the Shimadzu microtome, ultra thin sections were cut of pieces of the great auricular nerves of 2 patients suffering from lepromatous leprosy. The specimens had been dehydrated in alcohol and embedded in a 6:4 mixture of n-butyl and methyl methacrylate. The sections were examined under the electron microscope.

The authors first describe the appearance under the electron microscope of a transverse section of 2 myelinated nerve fibres, enclosed in a single Schwann cell, from one case in which there is only a slight beginning of degeneration. In other sections bacilli are shown inside axons, some of which axons have lost and others retained their myelin sheaths. In another plate regenerating axons and the beginning of myelin regeneration are shown. In yet another plate bacilli are shown in the cytoplasm of a Schwann cell lying " in side-by-side arrangement wrapped in an opaque droplet ". The conclusion is arrived at that " it would seem that leprosy bacilli are phagocytized by the axon and not by the Schwann cell ".

[The article is clearly illustrated, and should form a valuable contribution to the study of the relationship between the bacillus and the nerve fibre in leprosy.] *Ernest Muir*

de Vita, P. & Bini, L. Osservazioni sul quadro sieroproteico della lebbra. [**Observations on some Serum Proteins in Leprosy**] *Riv. Istituto Sieroterap. Ital.* 1958, May–June, v. 33, No. 3, 188–98, 2 graphs. [18 refs.] English summary (3 lines).

The authors examined the serum of 26 patients with leprosy by electrophoresis in the open boundary method. There was a correlation between the severity of the disease and proteinuria. As one might expect, the more severely affected patients who had a considerable amount of protein

in their urine had a correspondingly lower albumin level in their serum. As far as the globulins were concerned, the alpha 1 and alpha 2 fraction was considerably raised in the severe stages whereas the beta and gamma globulin fractions showed, compared with the milder conditions, if anything, slightly lower values. However, nearly all the gamma globulin values were slightly above normal. *H. Lehmann*

Gokhale, B. B. **Histamine in the Blood in Leprosy.** *Leprosy Review.* 1958, July, v. 29, No. 3, 155–7.

Using a microchemical method, the author compared the estimated amount of histamine in 78 non-leprosy subjects, and in 68 leprosy patients of whom 21 were lepromatous, 30 tuberculoid and 17 of other types. The means, in microgrammes per 100 cc. of blood, were 4·84 for non-leprosy subjects and 7·01 for leprosy patients. In lepromatous patients it averaged 6·94, and in tuberculoid patients it was 7·99, a figure which is highly significant. The question is raised as to whether there may be some connexion between this high content of histamine in tuberculoid leprosy and the positive lepromin reaction which is characteristically positive in the tuberculoid type. *Ernest Muir*

Zarco, R. M. & Chan, Veronica. **The Kahn, VDRL, and Complement Fixation Tests for Syphilis on Sera of Lepers.** *J. Philippine Med. Ass.* 1958, Apr., v. 34, No. 4, 205–12. [17 refs.]

These authors tested the sera of 108 patients suffering from leprosy by means of the standard Kahn, VDRL and New York State Department of Health complement-fixation (CFT) tests; in the first lipoidal antigen was employed and in the other 2 cardiolipin.

The 108 patients included 85 males and 23 females; ages varied from 10 to 61 years and over, the largest number being in the 21–30 group; the duration of the illness varied from less than 1 to more than 31 years, mostly 1–20.

Types of leprosy included 9 tuberculoid, 1 cutaneous, 97 mixed cutaneous and 1 unspecified.

The Kahn was positive in 57 cases (52·7%), the VDRL in 29 (26·8%) and the CFT in 4 (3·7%); 24·0% of the Kahn and 9·2% of the VDRL reactions were only "weakly reactive".

Both flocculation tests were positive in all cases where the CFT was positive.

Certain sera were also submitted to the TPI test in another laboratory; all reactive with the CFT were positive with the TPI and all which were non-reactive with CFT were non-reactive with TPI except 1.

It is concluded therefore that where the TPI test cannot be carried out the CFT is reasonably reliable.

[See also following article. The number of cases here is too small for

a reliable estimate to be made; no mention is made of treatment though these patients came from a leprosarium.] *T. E. Osmond*

Collier, W. A. & Bueno de Mesquita, S. J. **Syphilis Tests in Leprosy Patients.** *Trop. & Geograph. Med.* Amsterdam. 1958, Mar., v. 10, No. 1, 46–50, 2 figs.

It has long been known that leprosy patients tend to give positive reactions in tests for syphilis where lipoid antigens are employed.

These authors tested the sera of patients suffering from various forms of leprosy by means of the Wassermann, Kahn and Meinicke tests and compared the results with those of the leprosy complement-fixation test [this *Bulletin*, 1957, v. 54, 1087]. Results are set out in a table and 2 graphs.

These show that lepromatous (L) leprosy tended to give more positive syphilis reactions than tuberculoid (T) leprosy; these tests also were less positive in the LQ and LA stages [presumably quiescent and arrested respectively] than in the active L stages. In general the leprosy sera which give positive leprosy complement-fixation tests also give positive syphilis tests and negative leprosy tests correspond to negative syphilis tests.

Nevertheless the positive syphilis and leprosy tests are independent of each other; antibodies to leprosy are formed independently of the activity of the pathological process whereas antibodies which react with syphilis antigens depend on that activity. *T. E. Osmond*

Olmos Castro, N. & Arcuri, P. B. **Lepromin Hypersensitivity induced by Integral Lepromin in Persons presumably free from Leprosy.** *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 375–9.

In an endeavour to study the effects of the injection of integral (whole) lepromin on the reactions of sensitivity (early or Fernandez) and resistance (late or Mitsuda), 225 healthy persons were injected with Mitsuda-Hayashi antigen. Of the 225 persons 214 returned for the first reading, but only 92 for the second reading. In the first reading made after 48 hours 11·7% were positive; in the late reading on the 21st day 96·7% were positive. A second injection of the same antigen was given on the 21st day, that is the day of the late reading of the result of the first inoculation. Of the 92 in whom this inoculation was made only 79 returned for the early reading, and of them 56·1% were now positive as compared with 11·7% before, though the majority of the new reactors only reacted weakly. From these results it is concluded that in persons without contact with leprosy a single injection of integral lepromin can sensitize over 50% previously negative to the Fernandez reaction.

Ernest Muir

CHAUSSINAND, R. **A propos the BCG Test.** *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 392–4. [Reprinted in translation from *Rev. Tuberculose.* 1957, v. 21, 530–33.]

For the production of allergy to the bacillary bodies in tuberculosis the author considers that a saline suspension of bacilli killed by heat and taken from a virulent culture should be used; and injection should be made intradermally and not by scarification or multipuncture. This will provoke in persons infected with *Mycobacterium tuberculosis* a reaction similar clinically and histopathologically to that of the Mitsuda reaction in leprosy. The reaction begins in 24 to 48 hours (like the Fernandez reaction in leprosy) and then goes on to form a nodule which may ulcerate at its maximum in 1 or 2 weeks. There is practically no reaction in those without a tuberculous infection. In those who do not react to tuberculin, 0·1 mgm. of bacilli in 0·1 cc. of saline should be injected, but only 0·001 to 0·01 mgm. in people sensitive to tuberculin. The author counts as relatively immune those who have been vaccinated with BCG, are insensitive to tuberculin, but nevertheless react to an intradermal injection of killed virulent tubercle bacilli.

Tuberculin allergy is a sensitization to toxins, while allergy to bacillary bodies is an index of the state of resistance to superinfections [this *Bulletin*, 1956, v. 53, 1010]. In countries where leprosy is endemic, subjects free from tuberculosis but infected with leprosy and sensitive to lepromin will generally react to an antigen prepared from the tubercle bacillus. *Ernest Muir*

CHAUSSINAND, R. A propos de la théorie de l'antagonisme entre tuberculose et lèpre. [**The Theory of the Antagonism between Tuberculosis and Leprosy**] *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 365–9. [11 refs.]

The author compares in tabular form the known number of leprosy subjects with the number of deaths from tuberculosis in each of 10 towns scattered over Portugal. The table shows that in the places where leprosy is relatively active death from pulmonary tuberculosis is comparatively low, but where leprosy has practically disappeared the tuberculosis death rate is much higher. Thus in Porto, where the tuberculosis mortality rate is 1·21 per 1,000, the number of leprosy patients is 0·06 per 1,000; while in two towns in Leiria District where the leprosy rates are 3·00 and 2·94 per 1,000 the tuberculosis mortality rates are respectively 0·13 and 0 per 1,000.

The author put forward the theory of the antagonism between tuberculosis and leprosy in 1944 [this *Bulletin*, 1949, v. 46, 1052], but it has not yet been accepted by the majority of leprologists. This is due to a misunderstanding. Tuberculin allergy only indicates that the person is infected with tuberculosis, not that he has any immunity; but allergy

to lepromin is a reaction of the organism to injected bacilli and is analogous to the Koch phenomenon. To get a test in tuberculosis analogous to the Mitsuda test it is necessary to use an antigen composed of heat-killed bacilli, and only then "can we recognize that an antagonism exists, not only of tuberculosis against leprosy but also of leprosy against tuberculosis". *Ernest Muir*

Rodriguez, J. N. **Erythema Induratum Leprosum, a Deep Nodular Form of Reaction in Lepromatous Leprosy.** *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 313–22, 4 figs. on pl.

The use of sulphones in the treatment of leprosy has increased to 83% the occurrence of lepra reaction in lepromatous cases in the Central Luzon Sanitarium, and has thus brought to light some interesting features of this condition. The particular condition described shows itself by the appearance of "deep-seated subcutaneous nodules and chronic fibrous masses". Many patients die either of tuberculosis or nephritis, or of anorexia and asthenia.

The parts affected by the indurated condition are principally the dorsal aspects of the forearms and hands, and the antero-lateral aspects of the thighs. Cross section during the reactive phase shows a central fibrous core with nodules in various stages of development all round it. There are usually two successive alternating phases, the active and the passive. In the active phase there is irregular fever, the patient walks with a slow, crouching gait, and has difficulty in rising or sitting down. The patient looks sickly, but does not feel ill enough to go to bed. The individual nodules are deep-seated, but may come to the surface and burst, during which process they are intensely painful. In the quiescent phase the patient can go about his ordinary work, but he cannot tolerate the usual doses of sulphones.

This condition occurs most frequently in advanced stages of leprosy. Histologically there is a proliferative vasculitis involving both arteries and veins of the hypoderm. There is also massive leprotic panniculitis, more severe than is common in the usual lepromatous nodule or in erythema nodosum leprosum. *Ernest Muir*

Schujman, S. **Beneficial Effects of Chaulmoogra in Leprous Neuritis.** *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 356–64, 6 figs. on pl.

In the author's experience nerve damage often occurs under sulphone treatment of patients with lepromatous leprosy; but, if adequate injections of chaulmoogra (20 to 30 cc. a week) are given over long periods, nerve damage is averted. It is also averted in patients who have had

adequate chaulmoogra injections for a considerable time and are then put on to sulphones. The hypothesis of Kátó and Gözsy [this *Bulletin*, 1956, v. 53, 1348] is quoted, that chaulmoogra acts by stimulating the reticulo-endothelial system; but the author confesses that he does not understand the method of action, though he is sure of its effectiveness. A list is given of 14 patients thus treated, with the symptoms, previous treatment, chaulmoogra treatment and the final results. *Ernest Muir*

Lewis, R. A., Kyi-Kyi, K. & Edwards, R. **Initial Dosage of Diaminodiphenyl Sulfone in the Treatment of Tuberculoid Leprosy.** *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 370–74.

The authors wished to find out whether there was any advantage in the treatment of tuberculoid leprosy with DDS in the full dose from the beginning as compared with a dosage gradually raised to the maximum over a period of weeks. Of 122 patients 63 were treated with primary ascending doses and 59 with maximum doses (75–100 mgm. daily) from the beginning. No significant difference was found between the two groups as regards improvement, reactions, neuritis or other side effects. It is recognized, however, that the same does not apply to the lepromatous form of leprosy. *Ernest Muir*

Dreisbach, J. & Cochrane, R. G. **A Study of the Effect of Streptohydrazid on Lepromatous Leprosy over a Period of about Three Years.** *Leprosy Review.* 1958, July, v. 29, No. 3, 136–42, 14 figs. on 4 pls.

The results are given of a study of 47 patients treated for periods ranging from 10 to 40 months with Streptohydrazid, 5·6 gm. weekly. Of these 47 patients, 28 were given intramuscular injections of 3 cc. of 50% Sulphetrone, twice weekly, for part of the period of treatment [how long Sulphetrone was given is not quite clear]. Clinical and pathological details, illustrated with photographs of 4 out of the 47 patients, are given to show the progress made.

There was much improvement in 16% of those on Streptohydrazid alone, and in 33·3% of those with Sulphetrone added.

The combined treatment is recommended for "rapid clearing of nasal and buccal lesions, and for those cases which show intolerance to sulphone therapy". When there is much intolerance Streptohydrazid may be given alone for the first year, and then Sulphetrone can be added. Further trials are planned to determine whether the combined treatment clears up cases more rapidly than DDS or Sulphetrone alone.

Ernest Muir

JOPLING, W. H. & RIDLEY, D. S. **"Vadrine" (S.131) in the Treatment of Lepromatous Leprosy: a Preliminary Report.** *Leprosy Review.* 1958, July, v. 29, No. 3, 143–7.

Because of favourable reports on its use in connexion with tuberculosis [*Bull. Hyg.*, 1955, v. 30, 1055], Vadrine [the p-aminosalicylate of 2-pyridyl-(4)-1,3,4-oxdiazolone-(5)] was given a trial in 7 consecutive cases of leprosy admitted to hospital. Of these, 5 had had no previous treatment, 1 had been treated with DDS for 7 years and another for 9 months. Vadrine is supplied in 200 mgm. tablets, and treatment began with 1 tablet daily and increased by 1 tablet every 6 days up to a maximum dosage of 40 mgm./kgm. of body weight. 5 patients have had 12 months' and 2 have had 9 months' treatment. The clinical results proved to be better in some and worse in others than those expected with DDS treatment. The biopsy index, by means of Ridley's method [this *Bulletin*, 1958, v. 55, 525], had a mean fall during the year of 26%, compared with 25% given with sulphones. On the whole, results so far seem to be very similar to these with sulphones, but a longer period of trial is necessary. Apart from anaemia in one patient, the absence of side-effects was striking. Details are given of all 7 patients.

Ernest Muir

BRODHAGE, H. **"Vadrine" (S.131) assessed bacteriologically in the Treatment of Experimental Murine Leprosy.** *Leprosy Review.* 1958, July, v. 29, No. 3, 148–54. [10 refs.]

3 groups of 15 rats each were injected intratesticularly with living rat leprosy bacillary suspension, and another group of 15 with a suspension of similar bacilli that had been treated with heat. In one group 0·2% DDS was added to the food, beginning 21 days after infection. In another group 1% Vadrine was similarly added. The other 2 groups acted as controls. The efficiency of the tested substance was judged after a year by the size of the testis and spleen, and by the bacterial index of tissue suspension of lung, liver and spleen. The method of preparation of stained slides, calibration of microscopes and working out calculations is described. Taking the ratio

$$\frac{\text{no. of bacteria per ml. testis homogenate control group}}{\text{no. of bacteria per ml. testis homogenate test groups}}$$

of control group of rats, infected with living bacilli but untreated, as zero, the ratio of the DDS-treated group was 65 and of the Vadrine-treated group 800, showing that both have a therapeutic effect, but that Vadrine is more efficient than DDS. The test results obtained in animals infected with bacilli treated with heat gave a ratio of 578 and thus gave rise to the suspicion that the technique for heat treatment (5 mins. at 100°C.) was incorrect or insufficient.

Ernest Muir

Tolentino, J. G. **Results of Six Months Supplementary Treatment of Lepromatous Patients with *Mycobacterium marianum* Vaccine.** *Internat. J. Leprosy.* New Orleans. 1957, Oct.–Dec., v. 25, No. 4, Pt. 1, 351–5.

A controlled trial of the therapeutic effects of *Myco. marianum* vaccine was made [this *Bulletin*, 1956, v. 53, 69]. The test included 20 lepromatous patients who in addition to treatment with DDS for over 6 months also received 5 injections of 0·1 cc. of *marianum* vaccine at monthly intervals. As controls there were 24 carefully matched patients who received only the DDS treatment.

There was clinical improvement in 70% in the vaccinated patients, and in 79% in the control group. There was no significant bacteriological improvement in either group. Changes of reactivity to lepromin were slightly more in the vaccinated group, but not to a significant degree, The local reactions to the vaccine produced nodules varying in size from 3 mm. to 40 × 45 mm., which tended to be larger with succeeding injections, and to be larger in tuberculin-positive patients.

Ernest Muir

Rogers, L. **Progress in the Control and Reduction of Leprosy.** *Lancet.* 1958, July 19, 107–9. [12 refs.]

The author sketches the progress made in the treatment and control of leprosy during the last 40 years. The principles of control of leprosy are four-fold; sample surveys to determine the incidence; the limitation of isolation measures to lepromatous open cases which generally form a minority; village segregation of infectious patients in special villages on a voluntary basis and examination at repeated intervals of contacts so as to diagnose newly developing disease at an early stage. The effects of work along these lines in the island of Nauru [this *Bulletin*, 1952, v. 49, 963] and in tropical Africa [*ibid.*, 1955, v. 52, 165, 983] are described, as is also the evidence of material reduction of leprosy incidence in Eastern Nigeria within 2 decades [*ibid.*, 1956, v. 53, 1241]. The effect on the campaign against leprosy of the discovery of the therapeutic use of sulphones is described. "The most important property of the sulphones is their effect in healing the lesions of the nose, throat and larynx, and ulcerating nodes, and very greatly reducing their infectivity—personally I very much doubt whether the comparatively few bacilli remaining deeply situated in subcutaneous nodules are likely to escape from the body in numbers constituting any material danger to other people."

New drugs are being tested to supplement the sulphones. The need for additional staff and funds is emphasized, which, now that the way has been prepared, would result in "the steady reduction in the incidence of the ancient scourge of leprosy probably nearly to the point of eradication".

Ernest Muir

Ekambaram, V. & Sharma, C. S. G. **Leprosy Relief and Control Work in Tirukoilus Taluk, South India.** *Leprosy Review.* 1958, July, v. 29, No. 3, 158–65.

The area described is some 80 sq. miles with a population of 65,290 living in 54 villages. There are 2,447 patients in the area, making a percentage of about 3·7, and there are also 1,767 from outside the area. There is a 20-bed hospital, and 6 clinics sited so that no patient has more than 3 miles to walk. DDS treatment is given, and also thiosemicarbazone for those who do not tolerate DDS well. Each clinic functions once a week, and the team of doctors and assistants travel round by jeep. Absentees are visited by health inspectors who find out the cause of absence and notify the doctor who, in the case of complications, can arrange for the patient to go to hospital. In a laboratory attached to headquarters routine examinations are done.

The chief difficulty is that the necessity of working in the fields makes it difficult to attend for treatment. This combined with superstition and ignorance are the chief causes for absence. The method of "leprosy villages" as used in Siam is deprecated as unsuitable for India, where there would be difficulties over land settlement, and children would become infected by mixing freely with the many other patients.

Ernest Muir

Chatterjee, K. R. **Experimental Transmission of Human Leprosy in Laboratory-Bred Selected Hybrid Black Mice and Syrian Hamsters.** *Bull. Calcutta School Trop. Med.* 1958, Apr., v. 6, No. 2, 83–5.

An inoculum was prepared from active cases of lepromatous leprosy by separating the bacilli from tissue by differential centrifugalization, and diluting the suspension of bacilli to a known number per cc. For the experiment 48 laboratory-bred Syrian hamsters and 106 hybrid black mice "bred under controlled supervision in the institution" were used. The mice were 12 to 20 days old and the hamsters 3 to 6 weeks old. The inoculations were chiefly intraperitoneal, but were also given subcutaneously and by a combination of these 2 routes, as well as into the scrotum, mammary glands, brain and sciatic nerve. The dose for mice was about 1,000 million bacilli, and for hamsters 3,000 million bacilli, but "the dose of inoculum was much reduced during the passage from animal to animal when for black mice it was between 1 and 20 million and for hamsters 1 to 50 million bacilli". [Unfortunately no mention is made of how many animals were used in passage from animal to animal.]

Of the mice, apart from those that died or were missing, 51 were killed at different intervals, and 18 were still living at the time of the report. Up to 3 months after inoculation there was no evidence of progress of the disease, and between 3 and 5 months there was very little progress. Of the 59 mice which died or were killed during the period of 6 to 14 months

8 were decomposed and could not be examined; the remaining 51 showed mild to heavy generalized infection. During the period of 6 months to over a year 14 hamsters were killed and 2 died; 7 of these showed definite though mild infection, 5 had moderate infection, and 4 showed generalized and heavy infection.

The animals with heavy infection became sluggish in their movements from 6 to 8 months after inoculation, with depilation, dry and rough skin and circumoral dryness. The spleen and liver were enlarged and nodulated, the testes were enlarged and the glands were occasionally enlarged. "Black mice, either inoculated direct from human source or from one animal to the other, showed presence of intra- and extracellular acid-fast bacilli in spleen, liver, kidney, omentum, glands, testes or ovary, nerve, skin, spinal cord, etc. where granulomatous changes were also observed. Animals inoculated one year or more ago showed heaviest infection." It was also noticed that hamsters inoculated direct from human source showed mild infection, but with the passage of infection from one animal to another heavier and generalized infection was observed. Lepromin prepared from affected black mice gave negative reactions when injected into patients with lepromatous disease but positive in tuberculoid leprosy.

The success claimed for this experiment, where so many previous attempts to transmit *Myco. bacterium leprae* to animals have failed, is attributed chiefly to the tissue-free inoculum used, but another factor is the particular breed of hybrid mice used. The want of uniformity in the results was thought to be due to variations in the patients from whom bacilli were obtained, or to the failure always to get samples of inoculum entirely free from tissue. [These results, if confirmed by other workers, may prove to be of considerable value in future research.]

Ernest Muir

KÁTÓ, L. **Experimental Transmission of Murine Leprosy to the Guinea-Pig by means of induced Macrophage Exudate and Suppression of the Natural Defence Mechanism.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 193–206, 6 figs. on 2 pls. [29 refs.]

In these successful experiments at infecting coloured guineapigs with *Mycobacterium leprae-murium*, 10 ml. of saline containing 0·1 mgm. glycogen was first injected into the peritoneal cavity to produce a macrophage exudate, and then 5 days later 1 ml. of a leproma suspension from a rat, rich in the rat leprosy bacilli, was injected into the cavity. The bacilli were rapidly ingested by the macrophages, thus escaping the harmful effects of the extracellular fluids, but the cells disintegrated within 24 hours unless an antihistamine was given daily to the animals. In these experiments the antihistamine used was 8 mgm. mepyramine maleate and granulomas loaded with bacilli developed in the omentum, in the peritoneum and in the abdominal wall at the site of inoculation.

within 8 weeks of the day of infection. The spleens became enlarged and contained numerous bacilli, which were present also in the suprarenal glands and some of the lymph nodes but not in the testes, kidneys or liver. The failure of the bacilli to grow on suitable media confirmed that they were not tubercle bacilli or "atypical" acid-fast bacilli. The infection could be readily transferred to other coloured guineapigs by the same method or back to rats; the infection could not be induced in white guineapigs.

An alternative method of inducing the infection was by giving a daily subcutaneous injection of 2·5 mgm. polyanethol sulphonate (Liquoid), an anticoagulant which is known to interfere with the cellular and humoral defence processes mediated through complement; neither heparin nor coumarin derivatives were similarly effective. *S. R. M. Bushby*

HELMINTHIASIS

*In this section abstracts are arranged as far as possible in the following order:—*Trematodes *(schistosomes, other flukes);* Cestodes *(Diphyllobothrium, Taenia, Echinococcus, other cestodes);* Nematodes *(Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.).*

Rabinowitz, D. **The Katayama Syndrome, the Early Allergic Stage of Bilharziasis.** *South African Med. J.* 1958, June 28, v. 32, No. 26, 658–60. **[16 refs.]**

"A case of Katayama syndrome, the allergic 'toxaemic' phase of infestation with the bilharzial worm, is described. The history of the disease, its pathogenesis, clinical features, diagnosis and treatment are briefly reviewed. Mention is made of marked disturbance in liver function tests occurring in the case reported and a tentative explanation is offered."

Nétik, J. & Letac, R. Mort simultanée de deux jeunes bilharziens par urémie aigue. Prèsence d'oeufs de schistosomes dans le parenchyme rénal. [**The Simultaneous Death of Two Young Men infected with *Schistosoma* through Acute Uremia. The Presence of Ova in the Renal Parenchyma**] *Bull. et Mém. École Nat. Méd. Pharm. de Dakar.* 1957, v. 5, 223–8, 2 figs.

Two young (17- and 18-year-old) Africans with severe vesical schistosomiasis died within 48 hours of one another in hospital in Dakar. The first died in uraemic coma. At autopsy the bladder wall was calcified, both ureters were dilated, and the kidneys contained calcified schistosomal lesions; on histology numerous eggs (*Schistosoma haematobium*) were

found in all 3 sites. The chief interest in this case lies in the numbers of eggs and associated lesions found within the kidney cortex.

The second patient arrived in hospital moribund, with a history of 4 days' lumbar pains and anuria due to urethritis. Radiography revealed a narrow rigid rectum before the patient died of acute peritonitis. Numerous calcified schistosomal lesions were seen in the sigmoid colon in association with diffuse regional inflammation in and around the bowel. There was acute nephritis with focal lesions going on to calcification, and again these contained schistosome ova in the cortex. A determination of the species of schistosome in this case was apparently not made.

An examination of 340 previous necropsy records revealed 7 cases of schistosomiasis, but this figure may be fallaciously low. 5 cases of interest among these are very briefly detailed as in each the ante-mortem diagnosis did not suggest the probable true cause of death—schistosomiasis.

The authors enlarge on the difficulty of determining the species of schistosome causing lesions by study of the egg residues seen in them.

A. R. D. Adams

LANOIX, J. N. **Relation between Irrigation Engineering and Bilharziasis.** *Bull. World Health Organization.* Geneva. 1958, v. 18, Nos. 5/6, 1011–35. [22 refs.]

The incidence and severity of schistosomiasis will often increase in parallel with the construction of irrigation systems designed to ameliorate the condition of the people, the disadvantages to them often balancing the advantages and at times resulting in the breakdown of large schemes. To prevent this the engineer and the hygienist must understand each other, and the author contributes a balanced statement of the problems of each for the consideration of the other.

Basically, the two have the same objectives—the distribution of water at as high a velocity as is reasonably possible in channels with steep banks and from which leakage is prevented—and to the extent that the engineer attains his objectives he meets those of the hygienist. Circumstances, however, may prevent him from doing so: an economic velocity demands a considerable gradient which may exclude some land from irrigation, and reduction of gradient, lessening of velocity, increase of width and partial stagnation of water may in consequence have to be allowed. The velocities acceptable to the engineer in different types of soil are stated, together with such information on velocity and the development of snails as is available, it being apparent that permissible rates would often discourage breeding. The important breeding may frequently, however, occur in secondary and tertiary parts of the distribution system where this type of control is impracticable. The engineer also wishes to avoid leakage of water which may account for practically half of the water handled. Of the two main types of waterproofing

acceptable to him, those requiring a covering of earth and those giving a hard internal surface to the canal, only the latter is of use to the hygienist and the best form is in concrete. The cost is relatively high but agricultural advantages are gained and sometimes justify the cost. Secondary and tertiary distribution systems may either be lined or be arranged as semi-closed pipe systems, which to the hygienist have many advantages though there are potential risks in them from the point of view of the engineer, and, of course, their cost is considerable.

Much research is needed and a valuable statement of its possible objectives is given, but in the meantime great advantages could be gained by the appointment of engineers to schistosomiasis control schemes. They could easily be given a short course followed by a period of in-service training in schistosomiasis control units to prepare them for their work. Their role would consist primarily in establishing and maintaining technical contact with Public Works engineers, participation in the planning and design of irrigation schemes (at the Public Works Department) and schistosomiasis control schemes (with the Public Health Department), and the following up of construction and lay-out of irrigation projects together with the supervision of application of measures for the control of snails. The types of measures which might well be used are listed, though the choice will always depend on local circumstances. [This paper represents a welcome approach from the engineers to the hygienist, both of whom could study it with profit.] *G. Macdonald*

McMullen, D. B. & Harry, H. W. **Comments on the Epidemiology and Control of Bilharziasis.** *Bull. World Health Organization.* Geneva. 1958, v. 18, Nos. 5/6, 1037–47.

There are major pitfalls in each of the three main points of attack in the control of schistosomiasis. Education and sanitation, desirable on many grounds and particularly important in this connexion, may not be effective in *Schistosoma japonicum* infections for which there are many reservoir hosts, and perhaps not fully effective for those by *S. mansoni*. Treatment remains unsatisfactory, results being encouraging only in the case of *S. haematobium* infections, and though it is a necessary part of any control programme it cannot be considered as an effective measure.

Owing to the weakness of these two methods interest has been concentrated on the production of molluscicides, though it has at the same time been diverted from the fact that snail control, if it were to be the only method applied, would have to be maintained for least one human generation to reduce the disease to near elimination. Many of the methods now in use do no more than temporarily interrupt transmission with perhaps very little result on the infection rate. There is some hope that careful study would reveal methods of farming which might be beneficial to crop production and at the same time detrimental to snail populations, but failing this the control of snails must be mainly by molluscicides. Greater

attention might be paid to the treatment of watersheds from their upper limits downwards so that areas once cleared are not rapidly repopulated, and to wider use of the prolonged maintenance of low concentration of molluscicides into the water. The Sudan mechanisms of a mechanical barrier to prevent the migration of snails down canals and of a chemical barrier formed by a permanently maintained low concentration of copper sulphate are examined in full. The low concentrations have the advantages of ease of administration, the possibility of rotation from water course to water course so that an extensive area could be covered, elimination of the host population in the control area and rapid reduction of transmission to zero as a result.

In any event, it would probably be desirable to use a combination of methods—health education, sanitation, treatment and snail control—but all programmes should still be regarded as experimental and requiring a very large element of research. *G. Macdonald*

PAULINI, E. **Bilharziasis Control by Application of Molluscicides. A Review of its Present Status.** *Bull. World Health Organization.* Geneva. 1958, v. 18, Nos. 5/6, 975–88. [Numerous refs.]

A carefully selected list of 78 references, many of them chosen because the works include summaries or reviews of literature, is annotated in a brief text which indicates the nature of the material available in the original. Molluscicides, classed as phenols, metals and miscellaneous compounds, are reviewed with a preference for the pentachlorophenols for normal use, with an interest in mercury and zinc compounds, and some regret that saponin and resin soap have not received more energetic trial. Circumstances must determine the best methods and rates of application but in many it is found that solid formulations as in balls or briquettes may be the most appropriate means and the rate of application must be considered in conjunction with the period for which a concentration is maintained. Evidence suggests that low concentrations applied for a long time are sometimes more effective and less expensive than high concentrations applied for a shorter time. The control of application is perhaps best carried out by chemical assay rather than biological test, while evaluation of results is so far only by count of snails, the effect of control activities on the incidence and severity of schistosomiasis in man being as yet inconclusive. There is an extensive literature on the factors which may affect the efficacy of molluscicides, notably mud and colloids in the water, sunlight, vegetation and temperature, and also on the best season and frequency of application. These can only be determined after ecological study, the results of which may make great variations in the most desirable form of programme.

The author concludes that it is desirable to continue research to find cheaper, better or more effective molluscicides or methods of application, to study ecological factors determining the season of application, the rate

of repopulation and the factors which reduce the efficacy of molluscicides, and finally to establish the role of snail control in the struggle against schistosomiasis. *G. Macdonald*

Wright, W. H., Dobrovolny, C. G. & Berry, E. G. **Field Trials of Various Molluscicides (Chiefly Sodium Pentachlorophenate) for the Control of Aquatic Intermediate Hosts of Human Bilharziasis.** *Bull. World Health Organization.* Geneva. 1958, v. 18, Nos. 5/6, 963–74, 1 fig. [10 refs.]

Field trials in Brazil and Egypt of 38 unspecified molluscicides demonstrate that when cost and availability are taken into account, sodium pentachlorophenate has the greatest overall effectiveness, but environmental conditions so greatly modify its efficacy that no one formula can be recommended for its universal application.

In Brazil the objects of control were *Australorbis glabratus* and *Tropicorbis centimetralis*. When they occurred in streams their control was largely dependent on the amount of waste and rubbish in the streams, and the best results were obtained by the application of the chemical in the form of briquettes or balls. In whatever way it was applied success depended on sufficient dosage to ensure the maintenance of 10 to 20 p.p.m. for 8 or more hours, chemical control indicating the usual necessity to introduce it at intervals of about 1,000 feet to maintain sufficient concentration throughout a stream. Snails on land could not be destroyed by a dosage of less than 100 gm. per m.^{2} in dry weather, but one day after rain they were destroyed by 25 gm. per m.^{2} and after 7 days' rain by 2 gm. per m.^{2} In static water 2 p.p.m. of sodium pentachlorophenate killed all snails.

Extensive works in Egypt aiming at the control of *Bulinus truncatus* in a canal system demonstrated the persistence of the molluscicide for surprising distances such as 22 km. from the point of application, and the maintenance of a satisfactory residual concentration in some channels for very long periods. Details are given of control works extending over nearly two years which indicate that a very high degree of control can be obtained by relatively infrequent applications of sodium pentachlorophenate and at costs less than those previously incurred in the application of copper sulphate. *G. Macdonald*

Brener, Z. & Mourão, O. G. Inquéritos clinico-epidemiológicos em focos endêmicos de esquistossomose mansoni em Minas Gerais. [**Clinico-Epidemiological Surveys in Endemic Foci of Mansonian Schistosomiasis in Minas Gerais**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, July, v. 8, No. 3, 519–26. [12 refs.]

The English summary appended to the paper is as follows:—

"The results of clinical and epidemiological surveys in five endemic areas of schistosomiasis in the State of Minas Gerais, Brazil, are reported.

Stool examinations made in 2,478 unselected individuals showed an index of infection of 53·8 per cent. Clinical examinations of 665 patients revealed spleen enlargement in 93 (13·9%) instances. The gravity of the disease indicated by the frequency of patients with spleen enlargement showed large variation in the areas studied and apparently was not related with the index of infestation of the local population."

Brener, Z. & Mourão, O. G. Observações sôbre a forma hépato-esplênica da esquistossomose mansoni em Minas Gerais. [**Observations on the Hepato-Splenic Form of Mansonian Schistosomiasis in Minas Gerais, Brazil**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, July, v. 8, No. 3, 511–17, 1 graph.

The English summary appended to the paper is as follows:—

"The results of a clinical study performed in 93 unselected patients infected with *Schistosoma mansoni* and presenting spleen enlargement are reported. These patients were living on 5 different endemic areas in Minas Gerais, Brazil. Patients with slight spleen enlargement were found to be very common. The frequency of spleen enlargement in the different age groups showed that this clinical finding is probably an early event and develops slowly during the course of the disease."

de Andrade, R. M. & Martins, Regina S. Contribuição para o conhecimento dos criadouros de planorbíneos no Distrito Federal: II. Resultado geral das pesquisas efetuadas para a localização de focos de transmissão da esquistossomose mansoni. [**Breeding Places of Planorbids in the Federal District; II. General Results of a Survey of Foci of Transmission of** *S. mansoni*] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Apr., v. 8, No. 2, 379–85.

The English summary appended to the paper is as follows:—

"The results of a survey on the potential breeding-places of the snail hosts of *Schistosoma mansoni* in 37 districts of the Capital (Rio de Janeiro, Brazil) were presented (October, 1952–May, 1955).

"1. 6,470 biotopes of different types were searched and 41·9% were found to be positive for snail.

"2. 14·4% of the total dips given in the positive biotopes caught snails.

"3. 75·5% of the collected snails were alive.

"4. The general snail density was 1·7 snail per dip.

"5. 40·8% of the collected snails were identified and examined.

"6. Of the identified snails there were 88·1% *A. immunis* (Lutz) (= *A. confusus* Lutz), 11·7% *A. tenagophilus* (d'Orbigny), 0·3% *A. bahiensis* (Dunker) (= *P. nigricans* Spix), and 0·02% *A. glabratus* (Say).

"7. *A. immunis* were found in each of 37 districts, *A. tenagophilus* in 28, *A. glabratus* in 1 (Jacarèpaguá), and *A. bahiensis* in 1 (Manguinhos).

"8. 0·05% (82) of the examined snails were found with cercariae of *Schistosoma mansoni*.

"9. Only two species, *A. immunis* and *A. tenagophilus*, were harboring cercariae of *Schistosoma mansoni*.

"10. The infected snails were distributed in five districts: Manguinhos (2·60%), Barros Filho (2·56%), Jacarèpaguá (0·11%), Madureira (0·04%), and Oswaldo Cruz (0·01%)."

[See this *Bulletin*, 1956, v. 53, 1131.]

Pellegrino, J., Paulini, E., Memoria, J. M. P. & Macedo, D. G. A reação intradérmica, na esquistossomose, com uma fração polissacarídea isolada de cercárias de *Schistosoma mansoni*. [**Intradermal Reaction in Schistosomiasis with a Polysaccharide Fraction isolated from Cercariae of** *Schistosoma mansoni*] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, July, v. 8, No. 3, 527–34, 1 fig. [11 refs.] English summary.

The results suggested that the polysaccharide fraction was not the only active part. [See this *Bulletin*, 1954, v. 51, 1268.]

Pellegrino, J. & Macedo, D. G. Novo critério de leitura da reação intradérmica na esquistossomose. [**New Criteria for Interpreting the Intradermal Reaction in Schistosomiasis**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, July, v. 8, No. 3, 499–509, 1 fig. [Numerous refs.]

The English summary appended to the paper is as follows:—

"It was proposed to evaluate the results of the intradermal test in schistosomiasis by measuring the area of the papulae by means of a planimeter or by a simplified method described in the paper. Fifteen minutes after the injection of the antigen the limits of the papulae were outlined with ink and transferred to a slightly wet absorbent paper pressed on the papulae. The measurement of the recorded areas could be easily carried out by any of the given methods. The reactions were classified as negative (areas up to 0·9 sq. cm), doubtful (areas of 1·0 and 1·1 sq. cm) and positive (areas of 1·2 sq. cm or more). It was claimed that the described criterion will represent a necessary step for the standardization of the skin test in schistosomiasis."

Carvalho, A. Esquistossomose mansônica do testículo—Registro de um caso. [*Schistosoma mansoni* **Infection of the Testis. Report of a Case**] *Anais Facul. Med. Univ. do Recife*. 1957, Dec., v. 17, No. 2, 223–5, **2 figs. on pl.**

Paulini, E. & Pellegrino, J. Observações sôbre a biologia do *Australorbis glabratus*. I—Influência da infestação pelo *Schistosoma mansoni* sôbre a susceptibilidade ao pentaclorofenato de sódio. [**The Biology of** *A. glabratus*. **I. The Influence of Infection with** *S. mansoni* **on its Susceptibility to Sodium Pentachlorophenate**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Oct., v. 8, No. 4, 551–4.

The English summary appended to the paper is as follows:—

"The relative susceptibility of infected and non-infected (*Schistosoma mansoni*) *Australorbis glabratus* to sodium pentachlorophenate was tested in the laboratory. The experiments were carried out in flowing water by adding a solution of the molluscicide in such a rate as to give a final concentration of 60 to 160 p.p.m. for 4 hours. In five experiments, the mean mortality rates after 72 hours were 88·7 and 47·9 percent among infected and noninfected snails, respectively. The implications of this finding were discussed."

[See this *Bulletin*, 1957, v. 54, 1103.]

Chaia, G., Paulini, E. & Queiroz, A. B. Ação do pentaclorofenato de sódio e do sulfato de cobre sôbre os ovos de *Australorbis glabratus* (Say). [**Action of Sodium Pentachlorophenate and Copper Sulphate on the Eggs of** *A. glabratus*] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Oct., v. 8, No. 4, 605–12. [14 refs.]

The English summary appended to the paper is as follows:—

"The sodium-pentachlorophenate at 10, 20 and 40 ppm. applied for 9 to 6 hours and the copper-sulphate at 30 ppm. for 9 hours killed 100% of the eggs of *Australorbis glabratus* in laboratory.

"It is recommended that the minimum period of time necessary to kill all eggs should be considered in applying these molluscicides in order to eliminate the possibility of repopulation due to surviving eggs."

Paulini, E. Algumas considerações sôbre o modo de ação dos moluscocidas. [**Investigations on the Mode of Action of Molluscicides**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1956, Oct., v. 8, No. 4, 545–9, 3 graphs.

The English summary appended to the paper is as follows:—

"A detailed analysis was made on the published results of some biological tests performed with pentachlorophenate on *Australorbis immunis* and copper sulphate on *A. immunis* and *B. boissyi*. The equations derived from the experimental results have indicated that the resistance to the toxic effect of the molluscicides increased proportionally with the concentration when this was low: sodium pentachlorophenate from 2 to 160 ppm, copper sulphate 1 to 10 ppm with *A. immunis*, 4 to 55 ppm with *B. boissyi*. When the molluscicide concentration passed the limits indicated the relation became inversed and the further increase

of concentration encountered progressively diminished resistance. It seems to be probable, by analogy, that adsorption is the determinating process during the course of intoxication by these molluscicides and the visible reactions of the snail like retraction, mucous secretion, etc. usually considered as means of self defence, may not have significance in the overall biological effect."

Brener, Z. Observações sôbre a infecção do camundongo pelo *Schistosoma mansoni*. [**Observations on** *S. mansoni* **Infections in Mice**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Oct., v. 8, No. 4, 565–75, 2 figs. & 2 graphs. [23 refs.]

The English summary appended to the paper is as follows:—

"Some aspects of schistosomiasis—specially those regarding the distribution of eggs and granulomas in the tissues—have been studied in mice experimentally infected with *Schistosoma mansoni*. Researches have been carried out on tissue fragments crushed between slides and cover-glasses or, occasionally, on histological sections. For such purposes mice have been killed every other day and, when necessary, daily. Data thus available have shown that the laying of eggs has begun at 34 days' infection and, also, that the first cellular granulomas may be observed at 40 days. The embrionary development of miracidia is completed in the short period of four days.

"As to the relationship between free eggs and those surrounded by cellular and fibrous tissue (granulomas), studies performed on the liver have shown that the latter increase gradually in number and become highly predominant from the 60th day on. Most granulomas were found to be surrounding mature living eggs. In the intestines, the great majority of eggs are lodged in the median part of the small intestine; a smaller number is deposited in the rectum. Counts performed along the intestines have demonstrated the existence of 25,000 to 40,000 eggs in that part of the digestive tract. Intestinal granulomas are observed at later stages of the disease. In fact, a large number of them may be found only after 70 days' infection. A great retention of eggs has been recorded in the following parts of the intestinal wall: serosa, muscular layer and submucosa."

Pellegrino, J. & Siqueira, A. F. Técnica de perfusão para colheita de *Schistosoma mansoni* em cobaias experimentalmente infestadas. [**The Technique of Perfusion for the Collection of** *S. mansoni* **from Experimentally Infected Guineapigs**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Oct., v. 8, No. 4, 589–97, 1 fig.

The English summary appended to the paper is as follows:—

"The perfusion technique described in the paper was considered quite

satisfactory. A total number of 51,702 worms was recovered after perfusion of the liver and mesenteric veins from 38 guinea pigs experimentally infected with *S. mansoni*. This figure represents 96·2 per cent of the total number of worms living in those animals. The guinea pig has proved to be a suitable laboratory animal when the recovery of a large number of worms is aimed, since this animal acquires heavy infections by the *S. mansoni*."

Bonsel, J., Stam, A. B. & van Thiel, P. H. Schistosoma-dermatitis te 's-Gravenhage. [**Schistosome Dermatitis in The Hague**] *Nederl. Tijdschr. v. Geneesk.* 1958, May 17, v. 102, No. 20, 938–42, 6 figs.

The English summary appended to the paper is as follows:—

"After bathing in a cunette at Kijkduin (The Hague) in June 1957, a number of persons developed papular dermatitis. The possibility of meadow dermatitis was ruled out; schistosome dermatitis was suspected. The presence of cercariae of the ocellata group was demonstrated in 40 snails (Lymnaea stagnalis) collected from the cunette. Experimental infection with these cercariae produced dermatitis in a human volunteer."

Gianotti, F. & Luvoni, R. Ulteriori contributi alla conoscenza della patologia cutanea delle mondariso e dei trapiantatori. Rilievi eziopatogenetici, parassitologici e medico-legali. [**Further Observations on the Dermatitis of Rice-Weeders and Planters**] *Rass. Med. Indust.* Turin. 1958, Mar.–Apr., v. 27, No. 2, 102–16, 9 figs. (1 coloured on pl.) [17 refs.] English summary.

This paper is the result of investigations by workers from the Milan Institute of Industrial Medicine into "rice-workers' dermatitis" which affects large numbers of workers every year in the rice-fields of Piedmont and Lombardy. The period covered is from 1955 to 1957 inclusive, but the same authors have already produced several papers previously on the subject.

3 forms of dermatitis are found, 2 of which are considered to be due to penetration of the skin by cercariae, while the third is a digital dermophytosis.

As the result of examining thousands of snails of *Limnaea* and *Physa* spp. a number of varieties of cercariae were found; 4 of these were fork-tailed; 2 others were identical with those of *Fasciola hepatica*, and *Fasciolopsis buski* respectively. The definitive hosts are aquatic birds, especially domestic ducks, and mice and rats. A point of considerable importance is that the snails were found alive in winter beneath the ice in the irrigation canals; so they are able to survive low temperatures. The histology of the skin lesions is illustrated by 3 photomicrographs

showing cercariae in the dermis and there is a coloured plate and 2 photomicrographs of the papulo-pustular dermatitis.

Treatment is *secundum artem*, and personal prophylaxis is by barrier creams (if used constantly) while insect repellents are of value in limiting skin trauma. For the snails calcium cyanamide and Cu SO_4 have proved valuable, the latter in 1 kgm. sacks per 100 sq. m. Rotation of crops is of considerable use in reducing the snail population.

A further paper on the medico-legal implications of this form of dermatitis seen as an occupational disease is in the press.

[See also Gianotti and Luvoni, *Bull. Hyg.*, 1956, v. 31, 163; Pancheri, and Modonese, *ibid.*, 916.] *W. K. Dunscombe*

Kagan, I. G. & Meranze, D. R. **The Histopathology of Experimental Infections in Mice with** *Schistosomatium douthitti*. *Amer. J. Trop. Med. & Hyg.* 1958, May, v. 7, No. 3, 285–93, 12 figs. on 2 pls. [23 refs.]

This is a continuation of previous work describing the penetration of cercariae of *S. douthitti* through the skin of mice and the changes in the liver [this *Bulletin*, 1956, v. 53, 341; 1957, v. 54, 1208]. The present paper deals with changes in the other organs. In the spleen the lesions around the eggs were rather diffuse; there was no increase in the haemopoietic response or in the lymphocytic nodules in the white pulp. In the intestine, ova were found in the submucosa and in the mucosal lamina propria. The area primarily involved was the inner muscle layer, from which ova and inflammation spread to the other layers. In the lungs, inflammatory nodules were found surrounding eggs, but mature living worms might be present in the lungs without producing any cellular response. No abnormal changes were found in the bone marrow, kidney and lymph nodes. The inflammatory reactions in the deer mouse (*Peromyscus maniculatus*), a natural host for *S. douthitti*, were less intense than those in laboratory mice; and so were the lesions produced by *S. mansoni*. [This paper contains many histopathological details which cannot be reproduced in an abstract and for which the original should be consulted.] *F. Hawking*

Nishimoto, M. [**Studies on the First Intermediate Host of** *Clonorchis sinensis* **in Tokushima Prefecture**] *Shikoku Acta Med.* 1958, Apr., v. 12, No. 4, 18–33, 7 text figs. & 12 figs. on 2 pls. [70 refs.] [In Japanese.] English summary.

In 1956 Yamaguchi *et al.* found the snail *Parafossarulus manchouricus japonicus*, the first intermediate host of *Clonorchis sinensis*, in Shikoku Island, Japan, for the first time [this *Bulletin*, 1957, v. 54, 457].

Between December 1955 and November 1957 the present author has

made surveys in Tokushima Prefecture. Of 10,400 snails, 118 (1·14%) showed larvae of *C. sinensis*.

Cercariae of 7 other species and metacercariae of 3 species were also found in *P. manchouricus* and these are listed. High rates of infection with *C. sinensis* were found in monthly collections in Ohtsucho, Naruto City, in May (4·15%) and October (2·49%).

Endemic foci of clonorchiasis were determined in Ohtsucho, north of the River Yoshino, and in a district of Tomioka-cho, south of the River Naka. *H. J. O'D. Burke-Gaffney*

HUANG, Wen-Hsien & CHIU, Jui-Kuang. **The Incidence of *Paragonimus* Metacercaria Infection in *Eriocheir japonicus* being marketed in Taipei, Taiwan.** *J. Formosan Med. Ass.* 1958, Mar., v. 57, No. 3, 167–8. [Fuller version in Chinese 158–66. (27 refs.)]

Taipei, the capital of Taiwan, Formosa, has not hitherto been an endemic focus of paragonimiasis, because the people there, unlike those in endemic areas in the island, do not habitually eat raw or salted river crab, *Eriocheir japonicus*, the most important second intermediate host of *Paragonimus westermani*; but many of the people from the Chinese mainland, who came to the island after World War II, were accustomed to eat " drunken crab ", that is to say, living river crabs immersed in a mixture of rice-wine, salt or soy sauce and a spice. Consequently the incidence of paragonimiasis in Taipei has markedly increased.

The authors examined, from November 1955 to November 1957, the incidence of metacercariae in river crabs marketed in Taipei and others caught by themselves. In all 1,152 crabs (*Eriocheir japonicus*) were examined, all from the Tamsui river or its tributaries. Tables 1, 3 and 4 give the results and Table 2 gives the results of examination of crabs caught in the Tao-yuan and Chung-li districts of Formosa. Of the 9 places included in the investigation, the incidence of metacercariae in the crabs varied from 0 to 37·5%, the average being 16·6%. The incidence was higher in crabs caught in rapidly-running, clear mountain streams. In the 191 positive crabs the number of cercariae found varied from 1 to 32, the average being 3·2. In the 1,152 crabs a total of 607 metacercariae were found, the average per crab being 0·53 metacercaria. KINUGASA in 1943 found a lower (0·32) incidence than this in crabs collected in the endemic areas of Taiwan.

Male and female crabs showed the same incidence and degree of infection. The incidence was lowest in young crabs with a carapace length of less than 30 mm. Marketed crabs usually have a carapace length of about 40 mm. The highest incidence of metacercariae was in the gills of the crabs, where they were found in 86·9% of positive crabs; next highest were the leg muscles (27·2% of positive crabs), the thoracic muscles (23·6%) and the liver (7·9%). Of the 607 cercariae found, 410 (67·5%) were found in the gills and 31 (5·1%) in the liver, 69 (11·4%)

in the thoracic muscles and 97 (16·0%) in the leg muscles. None were found in the heart or genital glands.

The infection could have been discovered in 87% of the positive crabs by examination of the gills alone, where the metacercariae were always seen in the blood-vessels running through the upper median line of the lobes of the gills; they were not seen in other parts of the lobes or attached to the surface of the lobes. They could be seen even with the unaided eye as milk-white round granules in the blood-vessels. All the metacercariae were identified as those of *Paragonimus westermani*.

G. Lapage

Novak, G. E. & Pilipenko, A. G. [**Studies on the Prevention and Treatment of Opisthorchosis in Sumy Region**] *Med. Parasit. & Parasitic Dis.* Moscow. 1958, v. 27, No. 3, 264–70, 2 maps. [12 refs.] [In Russian.]

The English summary appended to the paper is as follows:—

"1. Cyprinids in Dniepr and its tributaries: Diesna, Seim, Sula, Vorskla, the rivers of Sumy region are infected with metacercariae of Opisthorchis felineus and the molluscs Bithhylnia leachi are infested with cercariae.

"2. The population which lives in the region of these rivers eats locally caught fish in a raw slightly salted condition, usually on the 2nd–3rd day after it was caught. This results in infestation by Opisthorchis.

"3. Hexachlorethane which is used for treatment of the patients is not sufficiently effective. After 3–4 and even 5 courses of treatment a stable clinical improvement was achieved in 50%, while parasitologic effect only in 20% of the patients treated."

Mandoul, R., Sigalas, R. & Mourgues, R. Une épidémie massive de distomatose hépatique aux confins du Lot et du Lot-et-Garonne. [**A Massive Epidemic of Hepatic Fascioliasis in the Neighbourhood of Lot and Lot-et-Garonne, France**] *J. Méd. de Bordeaux.* 1958, July, v. 135, No. 7, 665–72, 2 figs. [Numerous refs.]

An outbreak of 200 cases in an area where watercress was cultivated.

Biagi F., F., Tay, J. & Portilla, J. Valor de una intradermo-reacción y una reacción de precipitatión en el diagnóstico de la fasciolosis humana. [**Value of an Intradermal and a Precipitin Test in the Diagnosis of Fascioliasis in Man**] Reprinted from *Rev. Latino-americana Microbiol.* 1958, v. 1, 69–78, 1 graph. [17 refs.] English summary (9 lines).

The authors have already described a precipitin reaction for the diagnosis of cysticercosis [this *Bulletin*, 1958, v. 55, 917]. They have

now prepared a similar test, based on an antigen made from *Fasciola hepatica* extracted with acetone: the preparation is described in full. The same antigen was used for an intradermal test for comparison.

The precipitin reaction was positive in titres of 1 in 5,000 to 1 in 30,000 in 6 of 7 proved cases of fascioliasis: the intradermal reaction was also positive, as it was in 14% to 27% of some 1,700 unselected persons: in this group the precipitin test was positive in only 1·4% to 4·0%. There was no cross reaction with the precipitin antigen in some 120 sera from persons with 13 other species of intestinal parasites, nor did antigens from 12 different helminths give other than a few reactions in lower titres with sera from the 6 patients who had been positive in the precipitin test.

As the precipitin test may be positive before the 2- to 4-month prepatent period after infection, it is suggested that it might be useful in epidemiological surveys, since it might be positive before *Fasciola* eggs are detected.

[This is encouraging, but the number of patients tested is small.]

H. J. O'D. Burke-Gaffney

MARTIN, W. E. **The Life Histories of some Hawaiian Heterophyid Trematodes.** *J. Parasitology.* 1958, June, v. 44, No. 3, 305–23, 24 figs. on 5 pls. [Numerous refs.]

NITZULESCU, V., SIMIONESCU, O. & LUCIAN, O. Contribuţii la tratamentul cestodelor mari cu decoct de sămînţă de bostan. [**Treatment of Infections by Large Tapeworms with a Decoction of Pumpkin Seeds**] *Microbiol., Parazitol. şi Epidemiol.* Bucharest. 1958, Jan.–Feb., v. 3, No. 1, 73–6.

The following is a translation of the authors' summary:—

The authors give the results of the treatment of infections by large tapeworms with a decoction of pumpkin seeds associated with an ether extract of *Filix mas*. The decoction was made from the kernels of the seeds only, in the following quantities: for an adult, 400 gm. of kernels; for 1–4 years, 150–200 gm.; for 5–10 years, 300–350 gm.; over 10 years, the adult dose. The crushed kernel is covered with one and a half times its weight of water and boiled in a water bath until it is changed into a viscid fluid. In 65 patients treated 34 (52·3%) were cured. The results were: 22 cures in 28 cases of *Diphyllobothrium latum*, 2 in 3 cases of *Taenia solium*; 10 in 34 cases of *T. saginata*.

Only those cases in which the scolex was eliminated are classed as cured.

H. J. O'D. Burke-Gaffney

Collomb, H., Pruvost, A. & Giraud, J. La cysticercose cérébrale. A propos de 11 cas de forme parenchymateuse associée à une généralisation parasitaire. [**Cerebral Cysticercosis; 11 Parenchymatous Cases with General Spread**] *Méd. Trop.* Marseilles. 1958, Mar.–Apr., v. 18, No. 2, 228–44, 1 fig. [16 refs.]

This article is concerned with the difficulties in diagnosis of cerebral cysticercosis due to deposition of the cysticerci in the substance of the cerebral hemisphere (parenchymatous form) rather than invasion of the ventricles and subarachnoid space. 9 cases encountered in Marseilles during the last 20 years are described, and 2 found in Madagascar [5 of these have been described previously]. 4 were infected in Madagascar, 2 in Corsica, 1 in French West Africa, and of the others, 2 may have acquired their infection in Germany or the Far East, 1 in Corsica or West Africa. and 1 in France or the Far East. 8 presented because of epilepsy, 1 of the symptoms of pressure on a cervical nerve root, 1 because of diminished visual acuity because of an intraocular cyst, and in the last subcutaneous nodules were found accidentally. In all, the diagnosis was established by biopsy or by radiology. [The literature on the clinical, pathological and diagnostic aspects of the infection is reviewed.]

3 of these patients were treated with diethylcarbamazine but it is not clear whether the observations are limited to these cases, or include the experience of others [see this *Bulletin*, 1954, v. 51, 614], and while it is difficult to assess the result, because of the spontaneous degeneration of the cysts, and the naturally capricious course of the infection, it would seem that the nodules become involved in an allergic reaction, become smaller and disappear, the epileptic attacks become less frequent, and the cerebrospinal fluid tends to become normal. *W. E. Kershaw*

Ayaduray, S. **A Case of Subdural Haematoma with Cysticercosis.** *Proc. Alumni Ass., Malaya.* 1958, June, v. 11, No. 2, 97–101, 2 figs.

Voge, Marietta & Heyneman, D. **Effect of High Temperature on the Larval Development of** *Hymenolepis nana* **and** *Hymenolepis diminuta* **(Cestoda: Cyclophyllidea).** *J. Parasitology.* 1958, June, v. 44, No. 3, 249–60, 29 figs. on 4 pls.

Bensted, H. J. & Atkinson, J. D. **Hydatid Complement-Fixation Test: Influence of Intermediate Host Protein on Specificity of Sheep-Hydatid Fluid Antigen.** *Brit. Med. J.* 1958, July 26, 203–5.

Hydatid complement-fixation tests are considered to be specific [see this *Bulletin*, 1932, v. 29, 747; 1953, v. 50, 827]. The test was found to

be positive in a man with a carcinoma of the lung who had a negative Casoni reaction, and who, shortly before, had been given a full course of sheep antirabic vaccine.

Experiments were undertaken in animals and in man [the original should be consulted for the details] showing that the use of an antigen containing both host (usually sheep) protein and the specific hydatid fraction can confuse the issue in those previously immunized with vaccines containing the same or related host protein. Nevertheless, from the limited evidence available it would seem that the induced sheep antibody produced by antirabic vaccine falls, in the absence of "booster injections", almost to zero in one year. *W. E. Kershaw*

Santos Dubra, A. Quiste hidático del lóbulo izquierdo del hígado abierto en vías biliares. Litiasis hidática concomitante. [**Hydatid Cyst of the Left Lobe of the Liver opening into the Biliary Passages with accompanying Lithiasis**] *Archivos Uruguayos de Med. Cirug. y Especialidades*. 1957, July–Aug., v. 50, No. 4, 516–25, 4 figs. [16 refs.]

Prieto Lorenzo, A. La lucha contra la anquilostomiasis en Portugal. [**The Campaign against Ankylostomiasis in Portugal**] *Med. Trop.* Madrid. 1958, Apr., v. 31, No. 4, 297–317, 6 figs. [13 refs.]

Ankylostomiasis was first reported, in the coal mining areas of Mondego and San Pedro de Cova, in 1932.

There is a description of the deep mine at Mondego with its high temperatures and high humidity. A campaign was started in 1952 when a small medical centre was set up together with a laboratory. The stools of 363 miners were examined. *Ancylostoma duodenale* was found in 179; *Ascaris lumbricoides* in 234; *Trichuris trichiura* in 185 and various tapeworms in 17. Often 2 or even 3 different varieties of worm were found in the same specimen. Treatment was provided for the sick and the carriers, hygienic measures were introduced, gum boots provided and calcium hypochlorite was used as a disinfectant. In 1953 the examination was extended to 918 villagers, of whom 140 had ankylostomiasis, 640 ascariasis and 468 trichuriasis. In 1954 only 56 miners had ankylostomiasis and in 1956 the number was reduced to 12. Concurrently there were substantial reductions in the incidence of accidents and the general sickness rate.

There is a similar story about the mine at San Pedro de Cova. The main feature there was the high incidence of double and triple infections, *e.g.*, among 866 underground miners 338 had ankylostomiasis, ascariasis and trichuriasis. The villagers also showed a high rate of infection. The

spread in the village was attributed to a gross lack of personal hygiene and to the use of human excrement for the cultivation of their small gardens. There was resistance to the use of footwear and by 1956 the ankylostome incidence had increased but for other worms it had decreased. The type of shoe supplied was altered; mobile latrines were provided and walls and soil were treated with 3% calcium cyanamide. The incidence among the miners, who could be disciplined, decreased materially but in the villagers it remained high.

The paper also describes the measures taken to control infection in rural non-mining villages near Coimba where the climatic conditions favour the survival of worms and their eggs. The people are poor, most are illiterate and defaecate in their gardens. These gardens, on which they depend for much of their food, are fertilized by composts of human and animal excreta. The incidence of infection is highest at ages 5–10. The main stress has been on educating the people on the life cycle of the parasite and on the dangers of faulty hygiene. The faeces were treated with a 10% solution of ammonium sulphate which prevents the maturation of the ova and augments the manurial value of the compost. The incidence of infection has come down in 1 village from 63·72% in 1948–49 to 22·66% in 1956–57. In another village *Necator americanus* has recently been found. It was imported by people who had lived in Brazil.

Treatment for infection was first by tetrachlorethylene in capsules but the side-effects made it unpopular and a trial is now being made of hexylresorcinol.

The conclusion is that ankylostomiasis can be controlled by treatment of the patients and carriers and by education of the people. It is not an important sanitary problem in Portugal so long as it is limited to small foci in sparsely populated areas. *Allen Daley*

KAGAN, I. G. **Hemagglutination Tests with *Ascaris* Antigens.** *J. Immunology*. 1958, May, v. 80, No. 5, 396–9. [10 refs.]

Infections in children—often multiple—with the different species of *Ascaris* occurring in man, the dog and the cat, have made the accurate serological diagnosis of related round worm infections desirable [this *Bulletin*, 1958, v. 55, 56, 558].

Antisera against *Ascaris lumbricoides* var. *suis*, *A. lumbricoides*, *Toxocara canis* and *T. cati* were prepared in rabbits by the injection of lyophilized antigen and infection with viable eggs. These antisera cross reacted with *Ascaris* and *Toxocara* antigens in haemagglutination tests. Absorption with heterologous antigens reduced the titres to zero. It is therefore concluded that crude polysaccharide antigen does not show species specificity in this test [see *ibid.*, 1937, v. 34, 452.]

W. E. Kershaw.

Nogueira, C. E. D. Ascaridiose das vias biliferas. (Com apresentação de um caso.) [**Ascariasis in Bile Ducts**] *Hospital.* Rio de Janeiro. 1958, July, v. 54, No. 1, 83–91, 2 figs. [11 refs.]

The English summary appended to the paper is as follows:—

"The author makes some considerations about bile duct invasion by *Ascaris lumbricoides* and reports a case in which the diagnosis was made during the operation. Five live ascarides were removed through the cystic duct, having one 30 cm. of length and 0·7 cm. of diameter. The common bile duct was dilated, without total obstruction, and bile culture didn't reveal any bacterial growth."

Emanuiloff, I. Untersuchung der Wechselbeziehungen zwischen Bakterien und Ascariden in der Darmparasitozönose bei Schweinen und Pferden. [**The Interaction between Bacteria and *Ascaris* Species in the Zoonoses of the Intestine of Swine and Horses**] *Zent. f. Bakt.* I. Abt. Orig. 1958, v. 172, Nos. 1/2, 113–26, 12 figs. [14 refs.]

The English summary appended to the paper is as follows:—

"The author investigated the interaction between bacteria and *Ascaris* species in the intestine of swine and horses.

"Between enterobacteria of the *coli*, *Pseudomonas* and *Proteus* group on the one hand, and *Ascaris* species on the other hand interactions of symbiotic character may arise. The antibiotic substances of *Pseudomonas* and the zoeloma fluid of *Ascaris* inhibit synergetically the growth of several gram-positive bacteria and of *Bact. alkaligenes* in the intestine of the host.

"*Bact. mesentericus* is antagonistic to *Ascaris*.

"The proteolytic enzyme of *Bact. mesentericus* can kill and destroy *Ascaris* completely in vitro."

See also p. 1262, Swartzwelder *et al.*, **Therapy of Trichuriasis and Ascariasis with Dithiazanine.**

Lie Kian Joe, Chow, C. Y., Winoto, R. M. P., Soegiarto & Rusad, M. **Filariasis in Djakarta, Indonesia.** *Amer. J. Trop. Med. & Hyg.* 1958, May, v. 7, No. 3, 280–84.

This survey was undertaken in the poorer living quarters, or kampungs, of Djakarta. The population consists of Indonesians, mostly indigenous to the area and of a low socio-economic status.

7,048 blood samples (more than half the population of the area) were collected from 8.00 p.m. until midnight. Microfilariae in blood smears

averaged 28·6 per 20 cmm. of blood and the highest count was 251. The youngest child infected was 3 years old.

The results of examination of 4,311 persons who had lived for more than 3 years in the area showed that the microfilaria rate was 10·4%: the incidence in males was 11·2%; in females, 9·7%. In contrast, in those who had resided for less than 3 years only 3·6% were infected.

Clinical examination was made of 324 persons. In 271, the microfilaria rate was 11·8%.

Not a single case of elephantiasis was observed. Painless swellings of the inguinal lymph glands were very common [38 to 54%]. On the other hand, of 239 persons who did not show microfilariae in the blood, 46·4% had lymph-node enlargement. Enlarged epitrochlear glands were found in 5 males and 4 females. Hydrocele was found in 14 patients.

Microfilarial periodicity was studied in 14 patients in the General Hospital. Samples of 60 cmm. of blood were taken at 3-hour intervals. Peaks were found at midnight in 5 cases, at 3 a.m. in 6, and at 6 a.m. in 3.

The parasite is thus *Wuchereria bancrofti* of the nocturnal type and is endemic in the kampung areas of Djakarta. *Philip Manson-Bahr*

Aguirre, G. H., Seraphim, Elizete M., Barbosa, J. A. & Rachou, R. G. Um foco de filariose bancroftiana em Castro Alves, Estado da Bahia. [**A Focus of Bancroftian Filariasis in Castro Alves, Bahia, Brazil**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, July, v. 8, No. 3, 433–5. English summary (4 lines).

The microfilaria rate was 5·9% and the vector *Culex fatigans.*

Lacerda, N. B. & Rachou, R. G. Filarioses humanas nas sedes municipais do Estado do Amazonas e dos Territórios do Acre, Guaporé e Rio Branco. [**Filariasis in Cities of Amazonas and Territories of Acre, Guaporé and Rio Branco, Brazil**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, July, v. 8, No. 3, 437–42.

The English summary appended to the paper is as follows:—

"Hemoscopic surveys for human microfilariae have been made from 1952 to 1954 in all cities (35) of the State of Amazonas and territories of Acre, Guaporé and Rio Branco, with a total of 33,676 examined persons. 644 persons presented microfilariae of *Mansonella ozzardi* and 38 of *Wuchereria bancrofti. M. ozzardi* is highly prevalent along the Solimões River and Rio Negro River. *W. bancrofti* has a very low incidence in the investigated area, where only one focus of bancroftiasis has been found (Manaus, Amazonas); the great majority of carriers of mf. *bancrofti* encountered in these surveys proceeded from Belém (Pará)."

VAN DEN ASSEM, J. & METSELAAR, D. **Host-Plants and Breeding Places of *Mansonia* (*Mansonioides*) *uniformis* in Netherlands New-Guinea.** *Trop. & Geograph. Med.* Amsterdam. 1958, Mar., v. 10, No. 1, 51–5, 3 figs. [11 refs.]

In the vicinity of Merauke in South New Guinea larvae of *Mansonia uniformis* have been found during the dry season on 5 different host plants, *Hydrocharis* (?), *Monochoria*, *Utricularia*, *Ipomoea* and *Azolla* (?), growing in inundated areas called *rawahs*. Larvae were found frequently on *Hydrocharis*, and also among the roots of several *rawah* grasses. In the laboratory the larvae also attached to the young roots of garden weeds and grasses placed in water. In this part of New Guinea *Pistia* and *Eichornia*, the "typical" host plants, were not found and the larvae showed no preference for *Pistia* when the roots of this plant were exposed with grass roots for the attachment of the larvae. The authors conclude that the behaviour of the female mosquito most probably determines the larval habitat, not choice of host plant by the larvae. [See also CARTER, *Ceylon J. Sci.* (B), 1950, v. 24, 1.] *B. R. Laurence*

VAN DIJK, W. J. O. M. **Transmission of *Wuchereria bancrofti* in Netherlands New-Guinea.** *Trop. & Geograph. Med.* Amsterdam. 1958, Mar., v. 10, No. 1, 21–33, 1 map. [11 refs.]

In the Bamgi-Ia region of the Edera District of New Guinea anopheline mosquitoes were found to be very uncommon and the malarial parasite index of 8 villages was from 0 to 4% (average 2·3%). Bancroftian filariasis, on the other hand, was considered to be hyperendemic, 32–55% of the adults of 5 villages showing microfilariae, with 6 cases of elephantiasis recorded in the 485 inhabitants examined. Only 5% of 237 inhabitants under 20 years of age showed microfilariae, whereas 55–56% of 115 individuals over 35 were infected.

Evening and night catches indoors of mosquitoes feeding on an infected carrier (showing 500–578 microfilariae/20 cmm. of peripheral blood) showed that *Mansonia uniformis*, *M. papuensis* and *M. longipalpis* were the commoner species of mosquito biting indoors. The captured specimens were then kept alive and dissected for developing filariae. Development was rapid in *M. uniformis* and 51 out of 56 fed mosquitoes were found to be infected. Infective larvae were found in 12 out of 18 mosquitoes that survived for 12½ or more days. The average number of larvae per mosquito was 52, but this number includes a single mosquito which, when dissected 8½ days after feeding, contained 430 sausage forms in the thorax. The development of the parasite in the mosquito is described in detail. From the sixth day the larvae began to increase in length and mature infective larvae were found after 12½ days (in the head after 13½ days). The largest number of mature larvae found in a single mosquito was 15.

Females of *M. papuensis* did not survive as well as those of *M. uniformis*, and only one specimen out of 42 survived to 12½ days when it was found to contain 3 infective larvae. Of the 42 females fed, 35 were found to be infected and these contained an average of 13 larvae per infected mosquito. Mortality in *M. longipalpis* was also high and only one female survived for longer than 12 days. In this species 20 out of 23 fed females were infected, and the average number of larvae per mosquito was 17. Some of the ingested microfilariae apparently remained in the pre-sausage form, and motile, up to 11½ days although shorter forms, but without tails, were also found. No further development of the parasite was observed in *M. longipalpis* and the author believes development is not possible in this species. *Mansonia crassipes* and *Culex squamosus* (?) were also fed on the human carrier. *M. crassipes* was a poor biter and few females fed. One of these females contained maturing larvae 12½ days later. One female of *C. squamosus*, killed after 15½ days, contained 2 infective larvae. No natural infections were found in a small collection of *Mansonia* in this area and there was no evidence of any previous infection in the mosquitoes fed on the human carrier.

The author concludes that *M. uniformis* and *M. papuensis* may be important vectors of periodic Bancroftian filariasis in some areas of New Guinea. [For other vectors in New Guinea, see this *Bulletin*, 1951, v. 48, 386, and 1957, v. 54, 1214.] *B. R. Laurence*

Larivière, M. & Bèzes, H. Fistule pyélo-lymphatique d'origine filarienne. [**Pyelo-Lymphatic Fistula of Filarial Origin**] *Bull. Méd. de l'A.O.F.* Dakar. 1958, Apr.–June, v. 3, No. 2, 197–9, 2 figs.

A case due to *Wuchereria bancrofti*.

Sun, Kuei-Yü. **A Case of *Wuchereria bancrofti* Microfilaria in the Anterior Chamber.** *Chinese Med. J.* Peking. 1958, July, v. 77, No. 1, 74–5, 1 fig.

Wharton, R. H., Edeson, J. F. B. & Laing, A. B. G. **Laboratory Transmission of *Wuchereria malayi* by Mosquito Bites.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 288.

Previously *Wuchereria malayi* has been transmitted from man to various animals by the subcutaneous injection of infective larvae dissected out of infected *Mansonioides* mosquitoes [this *Bulletin*, 1958, v. 55, 196]. Laboratory-reared *M. uniformis* have now been fed on a human carrier, and transmission of the parasite to cats by the bite of the infected mosquitoes has been successful in two out of three attempts.

[See also Yokogawa, this *Bulletin*, 1940, v. 37, 652.]

B. R. Laurence

Buckley, J. J. C., Nelson, G. S. & Heisch, R. B. **On *Wuchereria patei* n.sp. from the Lymphatics of Cats, Dogs and Genet Cats on Pate Island, Kenya.** *J. Helminthology.* 1958, v. 32, Nos. 1/2, 73–80, 3 figs. on pl. & 9 text figs.

Nelson and Heisch [this *Bulletin*, 1957, v. 54, 592] recorded in 1957 [in the references the date is incorrectly given as 1956] the presence of sheathed microfilariae resembling those of *Wuchereria malayi* in the blood of domestic cats and dogs on Pate Island off the Kenya coast, but failed to find the adult worms. Since then similar microfilariae have been found in the blood of genet cats, which are common on the island, and adult worms (the parent forms of the sheathed microfilariae) have been found in the lymphatic system of 5 cats, 2 dogs and a genet cat. The authors consider that the new species " belongs to the *W. malayi* group which are characterized in the microfilarial stage by the presence of one terminal and one sub-terminal nucleus in the tail; and in the adults by the presence of only 5 pairs of adanal papillae in the male and by the well-developed centre section in the left spicule ".

This paper also contains a note on *Filaria ochmanni*, a sheathed microfilaria found by Fülleborn in the blood of dogs in Tanganyika. The authors give their reasons for believing that this species " cannot be classified with certainty ".

The morphology of the new species, *W. patei*, is fully described and illustrated and its relationships discussed. *R. M. Gordon*

Swartzwelder, J. C., Lampert, R., Miller, J. H., Sappenfield, R. W., Frye, W. W., Abadie, S. H. & Coco, L. J. **Therapy of Trichuriasis and Ascariasis with Dithiazanine.** *Amer. J. Trop. Med. & Hyg.* 1958, May, v. 7, No. 3, 329–33, 1 fig.

McCowen *et al.* [this *Bulletin*, 1958, v. 55, 436] reported anthelmintic activity of Dithiazanine against ascarids and whipworms of dogs, and Frye *et al.* [*ibid.*, 1958, v. 55, 436] obtained high cure rates with this drug in human patients infected with *Trichuris trichiura.* The present authors report on its efficiency for the treatment of individual cases of severe clinical and subclinical human trichiuriasis, for mass therapy of this and for ascariasis. Swartzwelder *et al.* (*Arch. Intern. Med.*, 1958, in the press) report a cure rate of 89% of cases of human strongyloidiasis and Miller *et al.* (*Amer. J. Digestive Dis.*, 1958, in the press) successfully used Dithiazanine for the treatment of enterobiasis.

Dithiazanine, supplied by Eli Lilly and Co., is a blue powder not readily absorbed from the intestine. It colours the faeces blue, but stains on diapers can be removed by laundering. The authors gave it to almost all their patients in 100 mgm. enteric-coated tablets, but a few patients had either 50 mgm. tablets or a cherry-flavoured suspension of the drug containing 20 mgm. of Dithiazanine per ml.

Trichuriasis

Individual doses of Dithiazanine were given in a Louisiana hospital to 36 children who had clinical or subclinical trichuriasis. All of them, except 10, weighed less than 40 lb. Stools were collected before, during and for one or more weeks after treatment and egg counts were done on these by the Stoll and formalin-ether techniques. Adult *Trichuris* evacuated were collected and urinalyses were done before and after treatment and showed no abnormality.

At first the children were given 10 mgm. per lb. body weight per day in divided doses given 2 or 3 times a day. Finally they were given 20 mgm. per lb. body weight in divided doses 3 times a day (*i.e.*, 200 mgm. thrice daily, with a maximum of 600 mgm. per day), for 5 or more days, according to the severity and intensity of the infection. Table 1 gives the doses and the results. Complete clinical and parasitic cures resulted when enough Dithiazanine was given and the diarrhoea and dysentery ceased. In the 36 children there was a 98·2% reduction of the total egg count and complete parasitic cures resulted in 26 patients (72%). The authors consider that 100% cure was not achieved because some children left hospital before all the worms had been eliminated and because the initial doses given were too low.

Mass Therapy

By this method 262 mentally-retarded patients were treated in groups. All of them weighed more than 90 lb. and 201 of them were infected with *Trichuris trichiura*. Most of the infections were subclinical, but a few patients showed symptoms. Stools were collected before treatment and, for 1 to 2 weeks after it, preserved in formalin, and egg counts were done on sediment obtained by centrifugation. Dithiazanine was given for 1, 2, 3, 5 and 10 days at a dosage of 200 mgm. 3 times a day. Table 2 gives the doses and the results. In patients treated for 1, 2, 3, 5 and 10 days, the cure rates were 3, 24, 77, 97 and 100% respectively. The percentage reduction of the total egg count after therapy was, in patients treated for 1 day, 52%, for 2 days 88%, for 3 days 99% and for 5 days 100%, so that almost all the whipworms were eliminated by treatment for 3 days and significant reduction of the egg count resulted from treatment for 1 and 2 days.

Ascariasis

Of the 36 children treated for trichuriasis 30 were also infected with *Ascaris lumbricoides* and these, and 7 others infected only with *Ascaris*, were given doses, shown in Table 3, of 50 to 300 mgm. of Dithiazanine 3 times a day or 125 to 300 mgm. twice a day for 5 or 10 days (1 patient was treated for 12 days). Complete parasitic cure resulted in 24 (65%) of these 37 patients and there was a 96·2% reduction of the total egg count. But most of these children were treated for 5 days only and a longer course of the drug may be needed for complete elimination of all

the ascarids. The results show, however, that mixed infections with *T. trichiura* and *A. lumbricoides* may be successfully treated.

In addition 15 patients treated for trichuriasis for 1, 2 and 3 days by mass therapy also had ascariasis, and presumably received the mass therapy doses stated above. Among these there was complete elimination of the ascarids in 1 out of 5 patients treated for only 1 day; the percentage reduction of the egg count in these 5 patients was 75%. Complete parasitic cure of ascariasis was also obtained in 7 out of 8 patients treated for only 2 days, the percentage reduction of the egg count being 64%. The 2 remaining patients were treated for 3 days and the infection was eliminated.

The authors have treated more than 400 patients with this drug for 1 to 21 days and they have not noted any serious side-effects. Most of the children tolerated 200 mgm. 3 times a day for 5 to 10 days. Among 37 children, many of them debilitated, the only side-effect was vomiting in 9; in general, vomiting was only occasional and occurred only once; treatment was not suspended. A girl of 3 weighing 40 lb. accidentally took 14 tablets (1·4 gm. of Dithiazanine) at one time, but suffered no ill effects. *G. Lapage*

DEFICIENCY DISEASES

PLATT, B. S. **Malnutrition and the Pathogenesis of Disease.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 189–210, 3 figs. on 2 pls. & 8 text figs. [Numerous refs.] Discussion 211–16 [WADSWORTH, G. R.; ELSON, L. A.; HART, P. D'A.; BELL, S.].

This is the text of a lecture which covers a wide field—growth in infancy, infant mortality, the toddler, the growing child and puberty, pregnancy, lactation, adult life and old age, requirements for protein, intestinal disorders, adaptation of enzymes in tissues of animals on low protein diets, liver damage, control of body water, transverse trabeculae in bones. This defies abstraction, but the novice will find here clear and informative reading, and the large bibliography makes the paper a valuable reference for the expert.

A unifying theme running through the lecture is " the interdependence in the pathogenesis of disease of zymotic and endocrine factors and malnutrition ". *R. Passmore*

SPIES, T. D. **Some Recent Advances in Nutrition.** *J. Amer. Med. Ass.* 1958, June 7, v. 167, No. 6, 675–90, 21 figs. (14 coloured). [14 refs.]

This discursive essay records some of the author's experiences during the last 30 years in the Nutrition Clinic at Birmingham, Alabama. It is

beautifully illustrated with coloured plates, which show that, despite the great rise in the general standard of living in the Southern States, it is still possible to find examples of the classical deficiency diseases.

The author stresses the role of physicians as guardians of the health and nutrition of their patients.

Details of 12 illustrative cases are given. *R. Passmore*

Roels, O. A., Debeir, O. & Trout, Marian. **Vitamin A Deficiency in Ruanda-Urundi.** *Trop. & Geograph. Med.* Amsterdam. 1958, Mar., v. 10, No. 1, 77–92, 3 figs. [19 refs.]

Signs of vitamin A deficiency are reputed to be very common in Ruanda-Urundi. Bitot spots were found in about 10 per 1,000 of the males and in about 2 per 1,000 of the females examined. There were considerable regional variations and in some districts the incidence was much higher. The mean level of carotene in the serum was lower in the patients with Bitot spots than in controls. Men were more frequently affected and had lower levels of carotene in the serum than women. The diet of the people is notoriously low in fat and this may hamper the absorption of carotene taken in the food. An increase in the consumption of animal foods and vegetable oils is recommended. *R. Passmore*

Floch, H. Carotènes et acide ascorbique dans des feuilles de végétaux guyanais. [**Carotenes and Ascorbic Acid in the Leaves of Guiana Plants**] *Arch. Inst. Pasteur de la Guyane Française et de l'Inini. Publication No. 433.* 1957, Sept., 6 pp.

Çetingil, A. I., Ulutin, O. N. & Karaca, M. **A Platelet Defect in a Case of Scurvy.** *Brit. J. Haematol.* Oxford. 1958, July, v. 4, No. 3, 350–54, 2 figs. [26 refs.]

"Secondary thrombopathy was demonstrated in a case of scurvy by a prolonged bleeding time, positive tourniquet test, prolonged heparin clotting time, defective agglutinability and adhesiveness of platelets as studied by phase-contrast microscopy, and by an abnormal thromboplastin-generation test.

"The patient's platelets did not release the phospholipid factor on treatment with distilled water; this is considered to be pathognomonic of secondary thrombopathy.

"The literature on secondary thrombopathies has been reviewed, and it is concluded that the bleeding tendency in scurvy, which has been considered to be vascular in origin in the past, is due to a platelet defect. The similarity between onyalai disease and scurvy is pointed out."

Sydenstricker, V. P. **The History of Pellagra, its Recognition as a Disorder of Nutrition and its Conquest.** *Amer. J. Clin. Nutrition.* 1958, July–Aug., v. 6, No. 4, 409–14.

Jolliffe, N., Goodhart, R. S., Archer, M., Lopez, H. & Diaz, F. G. **Nutrition Status Survey of the Sixth Grade School Population of Cuba.** *J. Nutrition.* 1958, Mar., v. 64, No. 3, 355–98, 1 fig. [38 refs.]

This report describes a clinical and biochemical survey of over 2,000 schoolchildren in Cuba. The most important finding appears to be that 43·7% of the children in the public schools are underweight. Actual weights are not given, nor is the standard of comparison stated, but it is concluded that these children were not receiving sufficient nutrients.

Evidence of active riboflavin deficiency (angular stomatitis and naso-labial seborrhoea) was recorded in about one-third of the children. There was no clinical evidence of either beriberi or pellagra, but there was a high incidence of subclinical thiamine and niacin deficiency, as measured by the urinary excretion of these vitamins. These levels are considered to be dangerously low and the vitamin enrichment of rice, the staple food, is recommended " as an extremely valuable contribution to public health ". *R. Passmore*

Squires, B. T. **Observations upon the Oral Mucosa of the African.** *Central African J. of Med.* 1958, Mar., v. 4, No. 3, 104–11, 14 figs. [11 refs.]

Malnutrition frequently affects the mouth. Observations of the changes are useful for diagnostic purposes and also for following up the effects of treatment. Permanent records can be made of the state of the tongue by means of prints taken on glazed paper after the application of a special ink [see this *Bulletin*, 1954, v. 51, 89]. The squamous epithelium covering the side of the mouth can be examined by means of scrapings, which can be fixed and stained. In health the cells are uniform in size and stain evenly. In many forms of malnutrition the cells tend to fragment and stain unevenly. There are a large number of cells with little cytoplasm and deeply staining nuclei. The figures give excellent examples of tongue prints and buccal smears, and some of the changes found in malnutrition are described.

The use of ultra-violet light and sodium vapour light for examining the tongue is also described. *R. Passmore*

Waterlow, J. C. **Observations on Enzymes in the Human Liver. General Considerations and Preliminary Results.** *West Indian Med. J.* 1958, Mar., v. 7, No. 1, 44–52. [28 refs.]

The relation between dietary factors and infections as a cause of degenerative disease of the liver is discussed. Measurements of the enzyme content of biopsy specimens from the liver of malnourished children are reported. The activity of 3 dehydrogenases, transaminase, cytochrome reductase and succinoxidase enzyme appeared normal, but

choline esterase activity was reduced. It is suggested that liver disease may be attributable to a disruption of complex systems, involving a chain of enzymes, which is more easily damaged, rather than to the failure of a single enzyme. *R. Passmore*

Blankhart, D. M. **The Association of Growth Retardation and Endemic Enlarged Liver in Schoolchildren in the Island of Sangir, Indonesia.** *Trop. & Geograph. Med.* Amsterdam. 1958, Mar., v. 10, No. 1, 1–13, 1 fig. & 6 graphs. [26 refs.]

This is a careful study of the effect of enlargement of the liver and spleen on growth rates in children as measured by height for age. The regression lines of height in cm. (y) against age in years (x) summarizing the data as follows:

Number of children	Liver (L) and splenic (S) enlargement	Regression equation
272	L (0) S (0)	$y = 4{\cdot}20x + 79{\cdot}4$
461	L (¼) S (0)	$y = 3{\cdot}89x + 81{\cdot}7$
104	L (½) S (0)	$y = 3{\cdot}78x + 80{\cdot}1$
310	L (¼) S (+)	$y = 3{\cdot}08x + 86{\cdot}9$
255	L (½) S (+)	$y = 3{\cdot}17x + 86{\cdot}5$

The retardation in growth is most marked when both spleen and liver are enlarged, but is found when the spleen is normal. From this it is concluded that protein deficiency is the primary cause and malaria an aggravating factor. *R. Passmore*

Food and Agriculture Organization of the United Nations. **FAO Nutritional Studies No. 16. Protein Requirements. Report of the FAO Committee, Rome, Italy, 24–31 October, 1955.** pp. v + 52, 3 figs. [Refs. in footnotes.] Rome: 1957. [Sales agent in U.K., H.M. Stationery Office.] [$0.75; 3s. 9d.]

This monograph, prepared by an international committee of 14 members, sets out a modern approach to the problem of protein requirements. This is based on studies of human needs for amino acids. The approach is cautious rather than dogmatic and outlines new methods of study in preference to giving precise statements of requirements.

The committee describe a "Reference Protein" with a definite amino acid pattern, closely resembling that present in the proteins of milk, eggs and meat, but not identical with any single protein. "Safe practical allowances" of this reference protein are set out in relation to differing physiological needs and allow for individual variability as well as for adjustments for digestibility.

A table gives the amino acid content of various foods expressed as mgm. of amino acid per gm. of nitrogen: each food is given a protein score depending on how well the content of each amino acid present in it measures up to the amino acid content of the reference protein. Scores

for individual food proteins range from 22 (cassava) to 100 (egg). These scores are analogous to the classical biological values, with which they are compared. The value of this method of approach will be limited until there are much more data on the amino acid content of foods, obtained by modern methods of chemical analysis. The new method of expressing the results is important and should make for clear thinking.

This report is not likely to lead to any immediate alterations in statements of requirements of proteins such as the well-known ones contained in the recommendation of the Nutritional Committee of the British Medical Association and of the Food and Nutrition Board of the U.S.A. National Research Council. It will, however, demand careful study by those actively engaged in investigations of protein requirements, for it points a way to more precise assessments of physiological needs. The report is thus a valuable addition to the FAO series of Nutritional Studies. [See also this *Bulletin*, 1957, v. 54, 1456.] *R. Passmore*

Frenk, S., Gómez, F., Ramos-Galván, R. & Cravioto, J. **Fatty Liver in Children—Kwashiorkor.** *Amer. J. Clin. Nutrition.* 1958, May–June, v. 6, No. 3, 298–309, 2 figs. [61 refs.]

This paper can be recommended as a sensible and concise account of present knowledge. There is a good bibliography, but most of the papers referred to have already been abstracted here and regular readers of this *Bulletin* are not likely to learn anything new. *R. Passmore*

i. Chanda, N. K. **Pathological Study of the Liver in Kwashiorkor.** *Brit. Med. J.* 1958, May 31, 1263–6, 2 figs. [31 refs.]

ii. Kahn, E. & Stein, H. **Kwashiorkor and Cirrhosis.** [Correspondence.] *Ibid.*, 1958, Aug. 16, 448.

i. This paper, from Calcutta, describes the histology of the liver as seen at autopsy in 34 children who had died of kwashiorkor. They are divided into three groups. Group I (21 cases) showed fatty changes, focal necrosis with round cell infiltration and in one case massive necrosis. Group II (8 cases) showed, associated with focal necrosis and bile-duct proliferation, fibroblastic proliferation which is considered to be pre-cirrhotic. In Group III (5 cases) there was development of fibrous connective tissue extending from the portal tracts and sometimes encircling masses of liver cells, characteristic of cirrhosis. This study indicates the evolution of cirrhosis from fatty change (post-infiltrative cirrhosis) during the course of the disease.

ii. Kahn and Stein suggest that the cirrhosis reported by Chanda was probably due to other causes than kwashiorkor. Kwashiorkor is world-wide, but is associated with cirrhosis only in Jamaica and India; in South African children kwashiorkor is common but cirrhosis is rare. In Jamaica cirrhosis is usually the end result of veno-occlusive disease (which also

occurs in India). Toxic substances (for instance senecio) may be responsible for cirrhosis, and these may be concealed in the faulty diet.

R. Passmore

Hansen, J. D. L. & Schendel, H. E. **Studies on Nitrogen Metabolism in Kwashiorkor.** *South African Med. J.* 1958, May 10, v. 32, No. 19, 506.

In children convalescent from kwashiorkor the absorption of nitrogen from a diet based on maize meal was poor (66%) and not increased by adding glycine. It was significantly improved by adding maize germ and green-pea flour.

Nitrogen absorption was good when the food consisted in a synthetic mixture supplying 18 amino acids with glucose, vitamins and salt, and was not reduced when the formula was restricted to the 11 amino acids considered essential for man. *R. Passmore*

HAEMATOLOGY

Judy, Harriet E. & Price, Noreen B. **Hemoglobin Level and Red Blood Cell Count Findings in Normal Women.** *J. Amer. Med. Ass.* 1958, May 31, v. 167, No. 5, 563–6. [18 refs.]

The authors engaged in this study when they failed only too frequently to bring the haemoglobin level and the red blood cell count up to the usually accepted standards of 14 gm. and 4·8 million.

Currently accepted "normal" blood counts for women are based on the arithmetical averages tabulated in 1933 on the total of reports from all sources, countries and methods, and more recent studies are similarly lacking in adequate criteria for determining the "normal" person.

In an attempt to find "normal" (American) women, 7,300 charts from their private patients were consulted, representing women at least 95% of whom were from middle-class homes; all but 663 were eliminated for one reason or another as not coming to the health standard required. The age of the subjects ranged from 11 to 69 years and they represented a wide variety of occupations; they were, in fact, the average woman in a doctor's private practice.

Oxalated venous blood was used in a Thoma pipette and the red cell count was made in a Spencer improved Nebauer counting chamber. Haemoglobin determinations from oxalated blood were all done by an alkaline haematin method in a Leitz-Rouey photometer which had been standardized against the photometer in a local hospital.

The 663 "normal" women consulted the doctor for various reasons, and can be divided into 3 groups, namely, (1) 84 without complaints, symptoms or positive physical or laboratory findings, (2) 293 with

physiological variations who had complaints arising from anxiety, tension or fatigue, (3) 286 who presented various gynaecological complaints such as dysmenorrhoea, irregular menses, menopausal symptoms, etc. The mean average red cell count for the 663 "normal" women was 4·37 million with a standard deviation of plus or minus 282,000. The mean haemoglobin level was 12·55 gm. with a standard deviation of plus or minus 1·15 gm. Thus in 95% of normal women the red blood cells fall within the range of 3·81 to 5·03 million and the haemoglobin level 10·2 to 14·8 gm. These figures are lower than those usually accepted.

There was very little difference in the red cell count and haemoglobin level of the various age-groups. Increasing age did seem to affect these values.

There was a difference between the values for the 3 groups. The first group, those with no complaints or symptoms, had a significantly higher mean red cell count and haemoglobin value than the second group of apparently normal women with complaints of anxiety, etc., not significantly higher than the third group but higher than the second and third combined. The values in the second group were significantly lower than in each of the other two groups considered individually or together. It appears that women who present only complaints originating from anxiety, tension or fatigue are normal to the usual physical and laboratory examinations but as a group tend to have lower red blood cell and haemoglobin values than those who have other types of complaint or no complaint at all. *P. A. Clearkin*

Zimmerman, H. J., West, M. & Heller, P. **Serum Enzymes in Disease. II. Lactic Dehydrogenase and Glutamic Oxalacetic Transaminase in Anemia.** *Arch. Intern. Med.* 1958, July, v. 102. No. 1, 115–23, 9 figs. [25 refs.]

"The serum levels of lactic dehydrogenase and glutamic oxalacetic transaminase have been studied in 82 patients with various types of anemia.

"LD levels were consistently elevated in patients with megaloblastic anemia and sickle-cell anemia. GOT levels were elevated when there was other evidence of hepatic disease.

"It is suggested that LD elevations in sickle-cell anemia are probably related to hemolysis and hepatic necrosis. In megaloblastic anemia this probably results from other factors."

Adams, E. B. & Forbes, P. F. V. **Vitamin B12 in the Megaloblastic Anaemias.** *South African J. Lab. & Clin. Med.* 1957, Dec., v. 3, No. 4, 291–9. [42 refs.]

After a review of literature concerning those types of megaloblastic anaemia that respond to folic acid and to vitamin B12 respectively, the

vitamin B12 levels in the serum of 16 Europeans, 16 Indians and 16 Africans living in Natal are given. The mean value for the Indians is approximately twice and of the Africans thrice the mean of 362 μμgm./ml. found in 126 persons in Britain by Mollin and Ross (*Proc. Roy. Soc. Med.*, 1954, v. 47, 428).

Serum vitamin B12 levels were also estimated in 21 African and Indian patients suffering from megaloblastic anaemia and in 14 were found to be below the lower limit of the normal range for persons in Natal (272 μμgm./ml.). Preliminary treatment with vitamin B12 was given to 8 patients in 5 of whom there had initially been control periods. In 3 patients, 2 of whom were pregnant, the response was excellent, in 3, 2 of whom were pregnant, it was good, in 1 pregnant woman it was poor and in 1, a patient with nutritional megaloblastic anaemia, there was no response.

Regarding their choice of treatment the authors state that of megaloblastic anaemias among Europeans in South Africa pernicious anaemia is the commonest type and for Europeans in South Africa with megaloblastic anaemia therefore treatment with vitamin B12 should first be given. Among Africans and Indians, however, the routine adopted is first to administer folic acid as all megaloblastic anaemias will initially respond to it but not all will respond to vitamin B12. The latter is later given to patients who have achlorhydria and to those, such as vegetarians, in whom there is a clear history of a diet deficient in B12.

A. W. Woodruff

Leikin, S. L. & McCoo, J. W., Jr. **Sickle-Cell Anemia in Infancy.** *J. Dis. Children.* Chicago. 1958, July, v. 96, No. 1, 51–7, 5 figs. [20 refs.]

"Two young infants with sickle-cell anemia are described. The percentages of hemoglobin S found in the babies were lower than those that have been described in older children or adults."

[See this *Bulletin*, 1950, v. 47, 1122.]

Lambotte-Legrand, J. & Lambotte-Legrand, C. Notes complémentaires sur la drépanocytose. I.—Sicklémia et malaria. *Ann. Soc. Belge de Méd. Trop.* 1958, Feb. 28, v. 38, No. 1, 45–53. [38 refs.] II.—Sicklémie et anémie par ankylostomiase. [**Notes on Sicklaemia. I. Sicklaemia and Malaria. II. Sicklaemia and Hookworm Anaemia**] *Ibid.*, 55–6.

I. This article rightly draws attention to the authors' contribution to the problem of sickling and malaria. It was in 1951 that the authors, in a general study of sickling and sickle-cell anaemia, pointed out that the mortality of sickle-cell heterozygotes was lower than that of normal

children and that there seemed to be a notable absence of cerebral malaria and malarial mortality in sicklers. The present paper carries on with these observations and states that in the years 1949–56 uncomplicated attacks of malaria (*Plasmodium falciparum*) at the Children's Hospital in Léopoldville occurred almost as frequently in sickle-cell heterozygotes as in normal children.

Admissions to hospital for Malaria 1949–1956

Type	Number	Sicklers (heterozygous)
Simple malaria	265	56 (21·1%)
Malignant and cerebral malaria	27	1 (3·7%)
Malarial anaemia	48	1 (2·1%)
Haemoglobinuria	2	0

However, complications, such as cerebral malaria and malarial anaemia, were remarkably less frequent in sickle-cell-trait carriers. 23 children died from malaria yet none of these was a sickle-cell-trait carrier. The percentages of sickle-cell-trait carriers among the children dying in 1949–50 (15·7%), a period of high malarial endemicity, and in the period 1956–57 (20·5%) where there was a low endemicity, are used to demonstrate the importance of malaria in influencing directly or indirectly the difference in mortality between sicklers and non-sicklers.

II. There has been a report by Raper [this *Bulletin*, 1956, v. 53, 1044] that he found less than the expected number of sickle-cell-trait carriers in a small number of patients with hookworm anaemia. Raper drew no conclusions but suggested that this observation should be followed up to see whether or not it was merely a coincidence. The present paper reports that the sickle-cell trait was found in 23% of 205 children with a severe hookworm anaemia (haemoglobin less than 5 gm.%). This percentage of sicklers is the same as that in the general infant population of Léopoldville (23–24%). *H. Lehmann*

Hendrickse, R. G. **Sickle Cell Haemoglobin C Disease and Homozygous Haemoglobin C Disease in Nigerian Children.** *West African Med. J.* 1958, June, v. 7 (n.s.), No. 2, 80–90. [37 refs.]

Although there have been a number of papers on the finding of haemoglobin C in West Africa, there have been few detailed clinical descriptions of sickle-cell haemoglobin C disease or of homozygous haemoglobin C disease from that part of the world. The present article reports on 8 examples of the first (and another in an addendum) and 1 of the second, all seen in Nigerian children under 10 years of age. There was no material difference between the disease as seen in West Africa and as described from the United States. [The use of the word "homozygous" in the absence of a family study is to be regretted. The finding of haemoglobin C only in the infant described under this diagnosis could possibly

be due to heterozygosity for haemoglobins A and C and for thalassaemia. This is unlikely, but experience has shown that the thalassaemia gene can behave in the most unexpected fashion.] *H. Lehmann*

Tanaka, K. R. & Clifford, G. O. **Homozygous Hemoglobin C Disease: Report of Three Cases.** *Ann. Intern. Med.* 1958, July, v. 49, No. 1, 30–42, 5 figs. [26 refs.]

"Three cases of homozygous hemoglobin C disease are presented. All were Negro females; two were young adults, and the third, age 67, is one of the oldest living patients known to us evincing this disorder. All patients presented a fairly uniform clinical picture consisting of mild but constant hemolytic anemia, periodic episodes of jaundice which cleared spontaneously, variable degrees of hepatomegaly and marked splenomegaly.

"The outstanding hematologic characteristics were the presence of numerous target cells in the blood smear, increased osmotic resistance to hypotonic saline, increased fecal urobilinogen excretion, slight but fluctuating icterus, mild reticulocytosis, and bone marrow studies compatible with hemolytic anemia. Hemoglobin electrophoresis in each case revealed a uniform spot characteristic of C hemoglobin. Red blood cell survival studies with radioactive chromium in one patient revealed a 50% red cell survival time of 21 days, and ferrokinetics demonstrated normal utilization of Fe^{59}. The diagnostic problem presented by these cases was eventually resolved by the relation of all the clinical manifestations to the presence solely of hemoglobin C."

Coelho, G., Setna, S. & Simmons, C. **Thalassaemia in Indian Children. (A Report of Twelve Cases.)** *Indian J. Child Health.* 1958, June, v. 7, No. 6, 378–85.

"1. A preliminary report of 10 cases of Thalassaemia Major and of two cases with a trait is presented.

"2. All had a microcytic hypochromic anaemia, target cells, decreased fragility and increased foetal haemoglobin.

"3. The treatment given is outlined."

Ghai, O. P. **Cooley's Anaemia. Familial Erythroblastic Fet-he-nemia.** *Indian J. Child Health.* 1958, June, v. 7, No. 6, 364–77. [91 refs.]

"11 cases of Cooley's anaemia are reported from Delhi (N. India). Their clinical and haematological findings were fairly characteristic of the syndrome and have been tabulated. Foetal haemoglobin was demonstrated in 6 cases as evidenced by delayed alkaline denaturation.

"A new name Familial Erythroblastic 'Fet-he-nemia' is suggested. A comprehensive review of literature is presented."

Brain, P. & Budtz-Olsen, O. E. **Thalassaemia-Haemoglobin E Disease in a Cape Coloured Family.** *South African Med. J.* 1958, May 31, v. 32, No. 22, 553–4, 1 fig.

The re-examination of a Cape Coloured family in South Africa of whom some members had hitherto been thought to be suffering from thalassaemia resulted in a change of the diagnosis to that of thalassaemia: haemoglobin-E disease. The Cape Coloured are a mixed people descended from Europeans, Hottentots, Bushmen and Asians with very little Bantu admixture. The mother of the family came from such stock and was the carrier of the thalassaemia gene. The deceased father had been a Cape Malay, and such people are descended from Eastern slaves not necessarily from Malaya. Of the children 4 suffered from thalassaemia: haemoglobin-E disease, 1 was a haemoglobin-E-trait carrier and 1 a carrier of the thalassaemia gene (thalassaemia minor). Only 1 of the 7 children examined was fully normal. It is clear that the father must have been a carrier of the gene responsible for haemoglobin E.

H. Lehmann

VENOMS AND ANTIVENENES

Halstead, B. W. & Modglin, Rene F. **Weeverfish Stings and the Venom Apparatus of Weevers** (*Trachinus*). *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1958, v. 9, No. 2, 129–46, 12 figs. [Numerous refs.]

"The scientific literature on the venom apparatus of weeverfishes is reviewed. The venom apparatus of *Trachinus draco* consists of its dorsal and opercular spines, and their associated glandular tissue. The gross and microscopic anatomy of these structures are discussed in detail. Weever venom possesses antigenic properties, and is believed to contain both hemotoxic and neurotoxic fractions. Only meagre data are available on the chemical and pharmacological characteristics of weever venom."

TOXOPLASMOSIS

Wahlgren, F. Toxoplasmos. [**Toxoplasmosis**] *Nordisk Med.* 1958, July 24, v. 60, No. 30, 1039–43, 5 figs. [11 refs.]

The English summary appended to the paper is as follows:—

"Congenital and acquired toxoplasmosis are briefly reviewed."

Etcheverry, R., Guzman, C., Regonesi, C., Katalinic, V., Muranda R., M. & Colodro, S. I., with the collaboration of F. Naquira & Erica Thiermann. Tercer caso de toxoplasmosis ganglionar comprobado en Chile. [**Third Verified Case of Human Glandular Toxoplasmosis in Chile**] *Bol. Chileno de Parasit.* 1958, Apr.–June, v. 13, No. 2, 32–5. English summary.

See this *Bulletin*, 1957, v. 54, 479.

Thiermann, Erica & Naquira, F. Contribución al estudio serológico de la Toxoplasmosis. I.—Reacciones de Sabin-Feldman y de fijación del complemento para la Toxoplasmosis en muestras de sangre de adultos aparentemente sanos. [**Contribution to the Serology of Toxoplasmosis. I. The Sabin-Feldman and Complement-Fixation Reactions in Blood Samples of Apparently Healthy Adults**] *Bol. Chileno de Parasit.* 1958, Apr.–June, v. 13, No. 2, 26–9. [16 refs.]

The English summary appended to the paper is as follows:—

"The Sabin-Feldman dye-test and the complement fixation test for toxoplasmosis were performed in a total of 415 blood specimens of normal adults in Santiago; 284 medical students, 19 to 22 years of age; and 131 blood donors, most of them over 30 years old.

"The dye-test was positive in 42·6% of the students and in 48·1% of the blood donors. Higher dye-test titers (1:256 to 1:4096) were observed in the students group (11·3%) than in the blood donors (4·6%).

"The complement fixation test for toxoplasmosis gave positive results in 11·3% of the students and in 2·3% of the blood donors.

"The authors remark upon the coincidence of positive dye-test titers in specimen with a positive complement fixation test for toxoplasmosis. It is considered, that both reactions are of considerable value for differential diagnosis and it is important to perform both reactions together and to repeat them during the course of infection."

Nagaoka, R. [**A Study of Changes in Serum Protein of Mice following an Intraperitoneal Inoculation of** *Toxoplasma gondii*] *J. Osaka City Med. Center.* 1957, Dec., v. 6, No. 12, 1037–50, 11 figs. (4 on 2 pls.) [43 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"Following an intraperitoneal inoculation of Toxoplasma gondii to mice, changes in serum protein were studied by means of paper-electrophoresis. A pathological survey was also made of the visceral organs. The results obtained were as follows:—

"A. Changes in Serum Protein.

"1. 12 hours after the inoculation, total protein showed a slight increase followed by a decrease, 72 hours after the inoculation it showed a marked increase.

"2. Albumin fraction steadily decreased following the inoculation, and 96 hours later it became less than a half the normal amount.

"3. Globulin fraction, showed a marked increase reaching more than twice the normal amount.

"4. An increase in globulin fraction was due to an increase of each fraction of α_1-globulin, α_2-globulin, β-globulin, γ-globulin. Especially β-globulin and γ-globulin were found markedly increased at the later stage.

"B. Pathological Finding.

"48 hours after the inoculation there were obviously observed the development of ascites and swelling of the liver and spleen. Histological change was chiefly found in liver and spleen. Namely it seems that the apparent dysproteinemia of serum protein has a close relation with the pathological change in visceral organs, chiefly in liver."

DERMATOLOGY AND FUNGUS DISEASES

Dey, N. C. **Medical Mycology including Laboratory Technique and Therapeutic Recipes.**

This book was reviewed on p. 1187.

Floch, H. & Mailloux, M. La Piédra noire americaine en Guyane Française. [**American Black Piedra in French Guiana**] *Arch. Inst. Pasteur de la Guyane Française et de l'Inini. Publication No. 432.* 1957, Sept., 8 pp., 5 figs. [17 refs.]

A general discussion and account of a case in French Guiana.

Goldschmidt, E. P., Taylor, G. W. & Demetroulakos, L. J. **Biochemical Changes occurring during Growth of** *Coccidioides immitis* **in a Defined Medium.** *J. Bacteriology.* 1958, June, v. 75, No. 6, 702–6, 3 figs. [10 refs.]

"The utilization of glucose, lactate, and ammonia by growing cultures of *Coccidioides immitis* has been determined. The data indicate that growth occurred first followed by fragmentation after maximum growth was obtained. Fragmentation started after most of the ammonium lactate was utilized.

" Cultures of *C. immitis* strain Cash produced 5 g extracellular peptide and 3·5 g extracellular polysaccharide per L during 1 week incubation in the defined medium."

[See this *Bulletin*, 1958, v. 55, 1046.]

Williams, R. M. & Skipworth, G. B. **Treatment of Disseminated Coccidioidomycosis with Amphotericin B. Report of a Case.** *Arch. Dermat.* 1958, July, v. 78, No. 1, 97–100, 6 figs.

" Improvement was evident in a case of coccidioidal granuloma involving the face following six weeks of therapy with intravenously administered amphotericin B. Previous six-week trial, administration of the drug orally, resulted in no clinical improvement."

TROPICAL OPHTHALMOLOGY

Thygeson, P. **The Present Status of Laboratory Research in Trachoma.** *Bull. World Health Organization.* Geneva. 1958, v. 19, No. 1, 129–52. [103 refs.]

" The present status of laboratory research in trachoma is summarized. The principal factors which have retarded research on this disease have been the lack of a suitable experimental animal and the failure of tissue-culture methods to provide serial cultures of the virus. Some avenues of investigation for the future are suggested."

[See also this *Bulletin*, 1958, v. 55, 96.]

Lee, D. J. **A Delayed Diagnosis of Bung Eye.** *Med. J. Australia.* 1958, May 31, v. 1, No. 22, 743.

" *Leptoconops stygius* is a diurnally active blood-sucking sandfly, occurring in the early summer with a peak abundance in the beginning of November, found over a wide area of the Hawkesbury River system from the coastal inlets to the Blue Mountains. It attacks man, other animals and poultry. In man, if the site of the bite is in the vicinity of the eye, it is likely to cause an acute, painless oedema of the eyelids. Ferguson's early records of bung eye in the Sydney area are now considered to have been caused by *L. stygius*. This local condition has no known relation to bung eye occurring in inland Australia."

MISCELLANEOUS DISEASES

THIJS, A. Considérations sur les tumeurs malignes des indigènes du Congo belge et du Ruanda-Urundi. A propos de 2,536 cas. [**Observations on Malignant Tumours in Africans in the Belgian Congo and Ruanda-Urundi**] *Ann. Soc. Belge de Méd. Trop.* 1957, Aug. 31, v. 37, No. 4, 483–514. [Numerous refs.]

From January 1939 to June 1955 a histological diagnosis of malignant tumour was made for 2,536 of the specimens submitted to the provincial laboratory at Stanleyville, Belgian Congo. The majority, 70%, were biopsy specimens, 20% were from autopsy material and 10% were viscerotomy specimens. Two-thirds of the material came from rural medicine centres in the north-east of the Belgian Congo. All types of malignancy were represented in this series and the author discusses the factors which would influence the relative frequency of the different types. In common with other parts of Africa the rural populations are more reluctant to consult doctors than the more sophisticated urban groups, this being particularly true of the older women and least for children. Patients will consult for the obvious and superficial tumours but less often for those which cause vague general signs. In addition, a laboratory will receive biopsy specimens from accessible tumours but, except for the relatively few autopsy and operation specimens, will see proportionately less material from abdominal, thoracic and intracranial tumours. Thijs presents an analysis of his material showing the proportion of each type to the total cancers, but underlines the need for incidence rates based on populations at risk.

Cancer of the genital organs and breast made up 45% of the female and only 8% of the male cases, while primary liver cancer, Kaposi sarcoma and reticulo-endothelial tumours accounted for 46% of the male total but only 14% of the female. A comparison was made between the proportional rates at all ages for the Stanleyville material and the Danish Cancer Registry 1943–53 [*Bull. Hyg.*, 1956, v. 31, 818]. In the Belgian Congo the proportions of the following types were greater than in Denmark—primary liver cancer, Kaposi sarcoma, melanoma, cancer of the penis and vulva, chorion-epithelioma, tumours of the ovaries and salivary glands, retinoblastoma and reticulo-endothelial tumours. By contrast the proportions of cancer of the digestive tract, lungs and prostate were less in the Belgian Congo. In Denmark breast cancers were one and a half times as common as uterine, while in the Congo the proportions were reversed. This might be related to the higher fertility and commoner breast feeding in African women.

The proportional distribution of types of malignant tumours are tabulated by age in decades for the 1,433 cases in which this was available. With the relatively young population of the Congo the peak frequency occurs earlier than in the Danish material from an older population.

The main cancer groups are discussed individually. Some of the main points in this discussion are: 237 out of the 258 primary liver tumours were hepatomas; 14% of the breast cancers were in men compared with only about 1% in European populations; the common practice of circumcision at or just before puberty did not prevent penile cancer; Wilms's tumour was far commoner than in European studies; whereas skin cancer in Europeans is related to exposure to sunlight, in the African it usually evolves slowly from chronic ulceration or burn scars and mainly affects the lower limbs; melanoma, usually on the feet, was common although it had been considered rare in Africans until fairly recently; the diagnosis in half the reticulo-endothelial tumours was lymphosarcoma, in one-third reticulo-sarcoma and in about a sixth Hodgkin's disease; adamantinomas formed a high proportion of lower jaw tumours; of the 96 malignant tumours in children under 10 years of age 28 were lymphosarcoma, 22 retinoblastoma and 11 Wilms's tumours.

[This detailed picture would be greatly enhanced, as the author admits, if he had population data to calculate incidence rates, and if steps were taken to counter some of the selective factors in his material. Although some outstanding features emerge this study shows the limitations of an analysis by proportional rates alone.] *J. Knowelden*

Higginson, J. & Oettle, A. G. **The Incidence of Cancer in the South African Bantu.** Reprinted from *Acta.* 1957, v. 13, No. 6, 949–55.

Lalich, J. J. **Role of Cyanoacetic Acid in Production of Lathyrism in Rats by β-Aminopropionitrile.** *Science.* 1958, July 25, v. 128, 206–7. [10 refs.]

Vervoorn, J. D. **Acute Necrosis of the Scrotal Skin.** [Correspondence.] *Trop. & Geograph. Med.* Amsterdam. 1958, Mar., v. 10, No. 1, 96.

The author, from Ahafo, Ghana, refers to Gratama's paper on scrotal skin necrosis in Liberia [this *Bulletin*, 1958, v. 55, 293]. In 8 months he has himself seen 10 cases among 5,000 out-patients in the Northern Territories of Ghana and 8 among 22,000 out-patients in Ahafo: all but one of these 8 came from the Northern Territories, where nutrition is poor, while the eighth was from Ahafo where protein nutrition is adequate.

The author quotes Simons [*ibid.*, 1954, v. 51, 1211] as stating that the condition has been observed as a complication of bacillary dysentery and of malaria. He does not, however, consider that filariasis in itself causes, or is at any rate the only cause, of this necrosis of the scrotal skin. Filarial infection is common in the Ahafo and in the people of the

Northern Territories, but scrotal necrosis is much commoner in the latter. Also, he found that penicillin, high protein diet and vitamins cured all his patients in 4 to 6 weeks. Most of the patients had some slight filarial infection, but most of the patients with symptoms of filariasis did not develop gangrene of the scrotum. He refers to the suggestion of VANBREUSEGHEM (quoted by SIMONS) who " assumes that a virus (or bacillus?) might cause phagedena when in symbiosis with ' various microbes ' ". Nevertheless, Vervoorn does not exclude nutrition as a factor in all his patients but one. *H. J. O'D. Burke-Gaffney*

PARASITOLOGY: GENERAL

MILOVANOVIĆ, M. & POPOVIĆ, D. Uticaj parazitarnih oboljenja na zdravlje naše omladine. [**Influence of Parasitic Diseases on the Health of our Youth**] *Higijena.* Belgrade, 1958, v. 10, No. 1, 47–52.

The English summary appended to the paper is as follows:—

" In our country there are still conditions for spreading of some parasitical diseases. In the article there are described the problems of parasitical diseases in Serbia and especially in our youth. According to the number and duration of diseases, as well as to damage to the organism, malaria is the first health problem. It attacks especially children and youth. In 1955 there were noted 480 malaria cases (to 25 years of age—70·2%) and in 1956 there were 475 cases (to 25 years—65%).

" From 1944 to the end of 1956 there were noted in Serbia 950 cases of kala-azar of which 408 were parasitologically confirmed. Most cases were under 25 years of age (80·9%). Of 69 parasitically confirmed cases 30·4% died. According to duration, breaking effect and high lethality kala-azar is one of the most serious problems of our youth.

" In school children in Serbia there were noted Ent. dysenteriae in 6–67% of cases; Giardia intest. in 2·5–35·3%; Balant. coli in 0–4·7% of cases. In some cases these parasites cause tissue and organic damage of long duration.

" Up till 1954 Trichinosis appeared only sporadically in Serbia. In 1954 there were two epidemics (at Milakovac, district of Žiča and at Ševarice in Mačva).

" Echinococcus is wide spread in Serbia. In 1954 there were 228 patients in hospitals (to 25 years—56·1%) and in 1955 there were 284 patients (to 25 years—56·6%). Surgical treatment because of echinococcus cyst were very frequent.

" In Serbia there is established also a high percentage of infection of children and youth by other helminths. This percentage is very high even in Belgrade: Ent. vermicularis 14·2–92·1%; Asc. Lumbr. 0–19·2%;

Trich. trichiura 4–61·5%; Hym. nana 0–5·1% and Taenia 0–0·3%. Sometimes helminths lead to serious pathological changes and threaten the life of infected persons.

"Even besides the large preventive measures undertaken for fighting against dermatomycosis it still remains a serious problem in Serbia.

"In the prophylaxis of parasitic diseases the hygienic culture (from early childhood) and raising of living standard are of great importance. Success can be achieved not only by systematic work of longer duration (in collaboration with health, social and educational workers) but also in collaboration with the people's authorities and great organisations, especially the Yugoslav Red Cross."

Jung, R. C. **The Management of Intestinal Parasitic Infections.** *J. Pediatrics.* St. Louis. 1958, July, v. 53, No. 1, 89–98. [33 refs.]

An account of the treatment of common intestinal parasitic infections. The treatment of 12 such conditions is summarized in a useful table.

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Bertram, D. S., McGregor, I. A. & McFadzean, J. A. **Some Diptera, other than Mosquitoes, from the Colony and Protectorate of the Gambia.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 217–22. [13 refs.]

The mosquitoes of the Gambia have been surveyed by the authors in a previous paper [this *Bulletin*, 1958, v. 55, 857]. Other insects entering European houses and African huts, or biting out of doors, belonging to 45 species and varieties, are recorded in this paper. *Culicoides austeni*, *C. nigeriae*, *Lasiohelea lefanui*, *Tabanus taeniola*, *T. biguttatus*, *Ancala latipes*, *Glossina palpalis* and *G. morsitans* are all recorded as biting man. *G. morsitans* is recorded here as biting indoors and was almost certainly introduced indoors from vehicles which had attracted the tsetse when passing along the bush roads. *Chrysomyia putoria* was found apparently breeding in bore hole latrines, and *Auchmeromyia luteola* was captured in an African hut. Human infections with *Cordylobia* [*ibid.*, 1957, v. 54, 889], trypanosomiasis [*ibid.*, 1953, v. 50, 1123], *Dipetalonema perstans*, kala azar [*ibid.*, 1950, v. 47, 530], and an infection clinically resembling

sandfly fever are all known in the area but, although *Chrysops distinctipennis* and *C. longicornis* are present, loiasis has not been recorded.

B. R. Laurence

Larivière, M. & Abonnenc, E. Les gites larvaires de Culicidae dans la presqu'île du Cap Vert. [**Breeding Places of Culicidae on the Cape Verde Peninsula**] *Bull. et Mém. École Nat. Méd. Pharm. de Dakar.* 1957, v. 5, 346–56, 1 map.

The area which is the subject of this report covers the promontory and part of the isthmus of the peninsula of Cape Verde (Senegal, West Africa), at the south of which is the town of Dakar.

A map shows the locality of the places mentioned and the topography, climate and mosquito breeding places are described. A list is given of 31 species of mosquitoes recorded from the area and the following potentially important species are specially mentioned.

Anopheles gambiae is fairly common on the south coast; adults have been taken in Dakar and some cases of malaria have occurred among young children in the Hann area. The only other anophelines taken are *A. pharoensis*, *A. coustani ziemanni* and *A. rufipes*. In the wet season Dakar is invaded by swarms of *Culex thalassius*; people who live near the breeding places are pestered for most of the year. In spite of control measures, *Aëdes aegypti* are taken each year in the suburbs. *Aëdes simpsoni* is also recorded but its breeding places have not been discovered. *Culex fatigans* is common in houses and breeding places are active all the year round.

H. S. Leeson

Doby, J. M. & Mouchet, J. Écologie larvaire de quelques espèces de culicidés dans la région de Yaoundé (Sud-Cameroun). [**Larval Ecology of Some Species of Mosquitoes in the Yaoundé Region, Cameroons**] *Bull. Soc. Path. Exot.* 1957, Nov.–Dec., v. 50, No. 6, 945–57, 4 figs. on pl. [11 refs.]

In an investigation lasting 3 months the larval habitats of the following species were studied: *Anopheles coustani*, *A. obscurus*, *A. smithi* var. *rageaui*, *Uranotaenia balfouri*, *Culex annulioris*, *C. tigripes*, *C. ingrami*, *C. duttoni*, *C. fatigans*, *C. tritaeniorhynchus*, *C. perfuscus*, *C. decens* and *C. pruina*.

Plant cover and illumination factors were assessed on an arbitrarily fixed scale but degrees of alkalinity, oxygenation, organic matter content and ammonia content are expressed quantitatively and shown in histogram form for each species.

Tentative conclusions about habitat preferences for the various species are drawn, but the authors emphasize the fact that their series are rather small and their investigation confined to the period from mid-July to mid-October.

E. R. Nye

Service, M. W. **A New *Anopheles* from the Southern Cameroons, *Anopheles buxtoni* sp. nov.** *Ann. Trop. Med. & Parasit.* 1958, July, v. 52, No. 2, 176–80, 2 figs.

Maffi, M. & Coluzzi, M. *Anopheles* (*Neocellia*) *salbaii* n. sp. Morfologia ed ambiente. [*A. salbaii* **n.sp.; Morphology and Habitat**] *Riv. di Malariologia.* 1958, June, v. 37, Nos. 1/3, 45–55, 13 figs. (3 coloured) on 3 pls. [11 refs.]

The English summary appended to the paper is as follows:—

"A description is given of a new species captured in Somaliland in the Farther Giuba region: *A.* (*Neocellia*) *salbaii*. The breeding places of the species have a considerable percentage of salt and are rich in sulphates. The species is closely related to *A. dancalicus* and *A. multicolor*, mosquitoes having their habitat in inland, semiarid, salt or alkaline areas.

"The description of the larvae, pupae and adults, obtained in laboratory from the captured specimens, allows an easy identification of *A. salbaii*.

"*A. dancalicus* seems to be the species of the Ethiopian region which is morphologically nearest to *A. salbaii*, but there are several characters, that render distinction easy."

Coluzzi, M. Descrizione di una nuova specie rinvenuta in Somalia. [**A New Species (of *Anopheles*) found in Somalia**] *Riv. di Malariologia.* 1958, June, v. 37, Nos. 1/3, 69–71, 5 figs. on pl.

The English summary appended to the paper is as follows:—

"The examination of some mosquitoes captured in the region of the Middle Uebi Scebeli allowed to signalize a new species of Somaliland: *Anopheles daùdi*.

"The species is described from the few captured female specimens."

Leeson, H. S. **An Annotated Catalogue of the Culicine Mosquitoes of the Federation of Rhodesia and Nyasaland and Neighbouring Countries, together with Locality Records for Southern Rhodesia.** *Trans. Roy. Entom. Soc. of London.* 1958, June 17, v. 110, Pt. 2, 21–51, 1 fig. [44 refs.]

In addition to being a catalogue of the culicine mosquitoes of North and South Rhodesia, Nyasaland, Bechuanaland, Mozambique and the Transvaal, and although it contains no keys, this paper can be used as a useful supplement to the standard works of Edwards [this *Bulletin*, 1941, v. 38, 737] and Hopkins [*ibid.*, 1953, v. 50, 870] on the mosquitoes of the Ethiopian Region.

In the first part of the paper 141 species and varieties are listed and, as well as the distribution in the area, notes on the biology and taxonomy of most of the species are given.

The second part of the paper is a detailed account of the distribution of the culicine mosquitoes in Southern Rhodesia. Here the species are listed under localities, which are shown on a map, and the geographical position, altitude and rainfall at each locality are also recorded.

B. R. Laurence

Rapp, W. F., Jr. **The Mosquitoes (Culicidae) of the Missouri Valley Region of Nebraska.** *Mosquito News.* 1958, Mar., v. 18, No. 1, 27–9, 1 fig.

Flooding of large areas of the Missouri Valley in 1952 made it likely that earlier work on the mosquitoes of the region would need revision. 6 light-trap stations operated in the Missouri Valley during the summer of 1952 and 25 species were recorded [although only 24 names are given in the text]. The abundance of the various species was found to have altered since the earlier survey of Tates and Gates (1944. Research Bulletin, 133; 1–27, University of Nebraska, College of Agriculture).

E. R. Nye

Vervent, G. & Rageau, J. Propriétés larvicides de plantes néo-calédoniennes. [**Larvicidal Action of Plants of New Caledonia**] *Bull. Soc. Path. Exot.* 1958, Jan.–Feb., v. 51, No. 1, 113–18.

The insecticidal activity of about 300 species of New Caledonian plants was tested against third- or fourth-stage larvae of *Culex pipiens fatigans*. The plants were dried and pulverized and mixed into dishes of water with the larvae, at concentrations of 0·2% and 0·5 per 1,000. Larval mortalities were calculated at intervals up to 48 hours, kills of over 84% being taken as indicative of satisfactory activity. About 70 species of plant satisfied the criterion. Indication is given of which parts of the plant were used in the tests.

D. S. Bertram

Lavoipierre, M. M. J. **Biting Behaviour of Mated and Unmated Females of an African Strain of** *Aedes aegypti*. *Nature.* 1958, June 28, v. 181, 1781–2, 2 figs.

Gillett [this *Bulletin*, 1955, v. 52, 1149] has already shown that some African races of *Aëdes aegypti* are able to ovulate without mating, whereas in other races most females require the stimulus of seminal fluid in the spermathecae before they can ovulate and lay eggs. The ability to ovulate without mating has also been shown to be determined genetically and Gillett has suggested the presence of an ovulation hormone

controlling ovulation [*ibid.*, 1957, v. 54, 627]. Unmated females of a strain of *Aëdes aegypti* kept at Liverpool, originating from Africa, did not ovulate normally and died more rapidly than mated females. Unmated females also continued to bite, although possessing oöcytes at the fifth stage of development. The author suggests that there is some relationship between increasing concentration of ovulation hormone and the inhibition of biting found in gravid fertilized females.

B. R. Laurence

Doby, J. M., Gaeremynck, L. C. & Deblock, S. Influence de la teneur en chlorure de sodium du gîte larvaire sur la sensibilité d'*Aedes aegypti* au D.D.T., en relation avec le développement des papilles anales. [**Influence of Sodium Chloride Content of Breeding Places on the Susceptibility of *Aëdes aegypti* to DDT in Relation to the Development of the Anal Papillae**] *Bull. Soc. Path. Exot.* 1957, Nov.–Dec., v. 50, No. 6, 957–70, 3 graphs. [25 refs.]

The effect of metallic ions on an insecticide is considered as two-fold: (i) catalytic decomposition of the insecticide as noted by Downs *et al.* [this *Bulletin*, 1951, v. 48, 1157; 1952, v. 49, 204; 1954, v. 51, 231], and (ii) alteration of the physiology of the exposed insect, thus indirectly affecting its sensitivity. In a previous paper [*ibid.*, 1956, v. 53, 1282] the authors considered the question of the effect of larval diet on sensitivity to insecticide.

Reviewing briefly the function of the anal papillae of mosquito larvae and the effect on their size of dissolved sodium chloride, the authors refer to the observations of Margalef (*Rev. Esp. Fisiol.*, 1949, v. 5, 251) who found that larvae with large papillae died more quickly in the presence of the toxic salts of heavy metals than those with small papillae. The authors then consider if the same effect might be found with respect to the action of DDT.

In their first experimental stage the authors confirmed the fact that the anal papillae of larval *Aëdes aegypti* develop inversely to the concentration of dissolved NaCl in the growth medium.

In the second experimental stage two groups of larvae were taken, one group was exposed to 5% NaCl for 3 minutes to destroy the anal papillae. At the third larval instar stage groups of treated and untreated larvae (with papillae intact) were exposed to 1/500,000,000 DDT for 22 hours at 26·5°C. The larvae were then returned to the normal growth medium and death curves plotted up to 11 days. In two series the percentage mortality was 73% for larvae with papillae and 44·4% for larvae without papillae in the first, and 83·4% and 70% respectively for the second. Altogether 1,000 larvae were used in the two series.

In the final experiment 700 larvae were used and mortality curves plotted, after exposure to 1/500,000,000 DDT as in the second experiment, for groups raised in distilled water and graded solutions of NaCl.

For those raised in distilled water the final mortality was 82%, as compared with 77% for those raised in 2·5% NaCl, 68·3% for those raised in 5% NaCl and 56·7% for those raised in 7·5% NaCl. The mortality of a control group raised in 7·5% NaCl was, however, 22·7% so that the final mortality of 56·7% for the DDT exposed group represents the sum of the effect of high NaCl concentration and DDT; it follows, therefore, that the mortality due to DDT alone would be lower in this group.

The results indicate that the anal papillae provide important absorbing surfaces for DDT and are in line with the finding of greater resistance to DDT in salt-marsh species as noted by DEONIER and GILBERT and DEONIER *et al.* [this *Bulletin*, 1951, v. 48, 412]. *E. R. Nye*

SURTEES, G. **The Production of DDT Resistance in a Southern Nigerian Strain of** *Aedes* (*Stegomyia*) *aegypti* **under Laboratory Conditions.** *West African Med. J.* 1958, June, v. 7 (n.s.), No. 2, 114–16.

The effect of DDT upon *Aëdes aegypti* collected from Ilobi village, 50 miles north of Lagos, has been studied in the laboratory. Tests on fourth-stage larvae indicated a resistance level of the same order as is found in other susceptible populations of this species.

An investigation into the potentiality of this strain to increase in resistance under insecticidal pressure showed that, after 5 generations of selection at 0·000001% DDT, the percentage of larvae killed at this concentration fell from 82% to 2·5%.

The tests on the 5 generations occupied 15 weeks, and it seems that in the field a programme of monthly larval control could produce a strain of comparable resistance in 4–5 months. *B. J. Wood*

See also p. 1217, SMITH & LOVE, **Winter and Spring Survival of** *Aedes aegypti* **in Southwestern Georgia.**

See also p. 1260, VAN DEN ASSEM & METSELAAR, **Host-Plants and Breeding Places of** *Mansonia* (*Mansonioides*) *uniformis* **in Netherlands New-Guinea.**

GILLETT, J. D. **Laboratory Colonisation of the Mosquito** *Eretmapodites chrysogaster* **Grah.** *Bull. Entom. Res.* 1958, June, v. 49, Pt. 2, 287–90.

A laboratory colony of *Eretmapodites chrysogaster* was maintained for over one year in connexion with work on the transmission of Rift Valley fever [this *Bulletin*, 1950, v. 47, (32)]. Two peculiarities in behaviour

were found when the colony was being established. Mating occurred regularly *after* the first blood meal of the female. Also few eggs were laid on moist paper, moist cotton wool, or in water containers of various sizes, provided for oviposition in the cages. Very many eggs, however, were laid in or near water contained in sterilized bracts of banana flowers placed in the cages. These bracts are the natural larval breeding place. After oviposition the bracts were transferred to water in 1-litre aluminium containers, and the larvae then fed partly on the decaying banana bract and also on powdered dog biscuit and Bemax, which were added daily in increasing amounts. *B. R. Laurence*

Forattini, O. P. *Culicoides* da região neotropical (Diptera Ceratopogonidae). Estudo monográfico. [*Culicoides* **(Diptera, Ceratopogonidae) of the Neotropical Region**] *Arquivos Facul. de Hig. e Saúde Pública Univ. de São Paulo.* 1957, Dec., v. 11, No. 2, 161–526, 132 figs. [Numerous refs.]

This monograph is a taxonomic study of nearly 100 species of *Culicoides* occurring in South America. It contains descriptions and keys for their identification and illustrations of specific anatomy. Maps show centres of dispersion and the recorded distribution of these insects. Their medical and economic importance is briefly mentioned.

H. S. Leeson

See also p. 1209, Lewis & Kirk, **Some Phlebotominae (Diptera) of the Sudan Republic.**

Lewis, D. J. **Some Phlebotominae from Iran.** Reprinted from *Ann. & Mag. Nat. Hist.* 1957, Sept., Ser. 12, v. 10, 689–94, 5 figs. [11 refs.]

9 collections of sandflies from Iran contained 5 species of which 4 (*Phlebotomus* (*S.*) *sintoni*, *P.* (*S.*) *palestinensis*, *P.* (*S.*) *squamipleuris* and *P.* (*S.*) *pavlowsky*) are new records for the territory and *Phlebotomus* (*Phlebotomus*) *ansarii* is a new species. There is a full description of the new species and notes on the other 4 species, all accompanied by numerous line drawings of morphological details. It is noted from the literature [this *Bulletin*, 1954, v. 51, 557] that no sandflies were found in villages of north-eastern Iran in recent years, probably owing to DDT sprayings. *D. S. Bertram*

See also p. 1277, Lee, **A Delayed Diagnosis of Bung Eye.**

Micks, D. W. **Paper Chromatography in Insect Taxonomy.** *Ann. Entom. Soc. of America.* 1956, Nov., v. 49, No. 6, 576–81, 4 figs. [23 refs.]

"Paper chromatographic methods were applied to whole specimens as well as extracts of Hemiptera (*Triatoma gerstaeckeri* and *T. infestans*), Orthoptera (*Periplaneta americana, Blattella germanica* and *Supella supellectilium*) and Diptera (*Culex molestus, C. fatigans, C. pipiens, Aedes aegypti* and *Anopheles quadrimaculatus*).

"One-dimensional chromatograms revealed qualitative differences between the three orders (Hemiptera, Orthoptera and Diptera) as to their respective patterns of ninhydrin-positive substances. Three genera of mosquitoes (*Culex, Anopheles* and *Aedes*) could be readily distinguished by marked quantitative differences in their amino acid levels.

"Chromatograms of larvae and adults of *Culex molestus, C. fatigans* and *A. quadrimaculatus*, although similar, exhibited quantitative differences in their ninhydrin-positive materials. Both sexes presented essentially the same chromatographic patterns. Three species of *Culex* (*fatigans, pipiens* and *molestus*) as well as *Aedes aegypti* presented qualitatively different chromatograms of fluorescent substances.

"Paper chromatography can be employed as a comparative tool to whole insect specimens or parts thereof without need for special equipment. Both the ninhydrin-positive and the fluorescent patterns can be used in resolving taxonomic problems."

March, R. B. & Lewallen, L. L. **Paper Chromatography of Fresh Tissue Extracts of Susceptible and Insecticide-Resistant Strains of the House Fly,** *Musca domestica* **L.** *Ann. Entom. Soc. of America.* 1956, Nov., v. 49, No. 6, 571–5, 1 fig. [18 refs.]

"Four susceptible and five insecticide-resistant strains of the house fly, *Musca domestica* L., and strains of *Fannia canicularis* (L.) and *Phaenicia sericata* (Meigen) were examined by means of paper chromatography of fresh tissue extracts. A number of differences in the chromatographic patterns of the nine house-fly strains were found, but none of these differences could be directly correlated with susceptibility or resistance. Instead, they seemed to be correlated with the origin of the strain.

"This study supports other work on the heterogeneity of both susceptible and resistant house-fly strains and the independent nature of various characteristics unrelated to resistance.

"In addition it suggests that caution must be exercised in interpreting results of taxonomic studies with chromatographic techniques since chromatographic patterns which are as distinct as those separating three

different species, *Musca domestica*, *Fannia canicularis*, and *Phaenicia sericata*, were found among the nine house-fly strains examined."

[See this *Bulletin*, 1955, v. 52, 96.]

Mitlin, N. & Baroody, Anne M. **The Effect of Some Biologically Active Compounds on Growth of House Fly Ovaries.** *J. Econom. Entom.* 1958, June, v. 51, No. 3, 384–5. [11 refs.]

"Fifteen synthetics and three materials of biological origin were tested for their effect on ovarian growth by feeding them to the house fly (*Musca domestica* L.). Coumarin, 1-phenyl-2-thiourea, piperonyl butoxide, *p*-quinone, and thiourea completely inhibited ovarian growth at the concentrations tested, but fish ovarian extract, 'queen substance' (a honey bee secretion), and the potassium salt of gibberellic acid had no effect. When injected into the flies, neither 'queen substance' nor gibberellic acid showed any effect on growth or as a toxic agent. Fish ovarian extract did not affect viability when applied to newly laid eggs, nor did gibberellic acid cause any change in growth at any stage when introduced in the larval medium."

Knapp, F. W., Terhaar, C. J. & Roan, C. C. **Dow ET-57 as a Fly Larvicide.** *J. Econom. Entom.* 1958, June, v. 51, No. 3, 361–2.

"Field comparisons of Dow ET-57 and malathion for determination of larvicidal efficiency against house flies and other types of Diptera under caged laying hens were made, using surface application of 1¼% solutions. Dow ET-57 gave an overall control of 78 to 99% at the end of the first and second week, respectively, while malathion gave a corresponding 0 to 67% control."

Black, D. M. & Mazur, S. **Impregnated Cords in the Control of House Flies.** *Canadian J. Pub. Health.* 1958, June, v. 49, No. 6, 248–53.

[See also Fay and Lindquist, this *Bulletin*, 1955, v. 52, 489, and Kilpatrick and Schoof, *ibid.*, 1956, v. 53, 816.]

Donnelly, J. **Methods for the Study of Blowfly Populations. III. The Fate and Distribution of ^{32}P in Blowflies labelled in the Larval Stage.** *Ann. Applied Biol.* 1958, June, v. 46, No. 2, 243–53, 1 fig.

"1. A simple method of radioactive labelling of *L. sericata* larvae is described.

"2. More uniform count levels are obtained in individuals which have fed entirely on radioactive foods than in those which first feed on non-active food.

"3. The radioactive count rates of the larvae are correlated with larval live weight and the counting rates of resulting imagines correlated both with corresponding larval counting rates and with imaginal live weight.

"4. The loss of ^{32}P in the larvae due to causes other than decay of isotope is traced from the prepupal stage to 3 weeks after emergence. The first and major loss occurs at emergence, when about 10% of the original ^{32}P is shed as empty puparium and meconium. Adults lose about 1·5% per day.

"5. The distribution of ^{32}P in the adult body of *L. sericata* labelled in the larval stage has been determined. The abdominal tissues have a lower activity than the rest of the body."

KNIPLING, E. B. & SULLIVAN, W. N. **The Thermal Death Points of Several Species of Insects.** *J. Econom. Entom.* 1958, June, v. 51, No. 3, 344–6.

"Investigations were made to determine the mortality of various insects when exposed to conditions simulating those found in closed uninsulated aircraft parked in the sun and in unrefrigerated compartments of supersonic aircraft. Fifteen species, including the American dog tick (*Dermacentor variabilis* (Say)), were exposed in a forced-draft electric oven for 15 to 60 minutes to temperatures ranging from 40° to 60°C. The various species differed widely in resistance to heat, but all were dead when exposed for 15 minutes at 60°C. These findings have quarantine significance, especially in supersonic aircraft where heat is generated by friction on the skin."

HADAWAY, A. B. & BARLOW, F. **Some Aspects of the Effect of the Solvent on the Toxicity of Solutions of Insecticide.** *Ann. Applied Biol.* 1958, June, v. 46, No. 2, 133–48, 1 fig.

"The effect of varying the solvent upon the contact toxicities of solutions of insecticides to mosquitoes and flies has been investigated using DDT, prolan, dieldrin, endrin and malathion. The insects were allowed to walk for a limited time on filter-papers impregnated with the solutions. Chemical structure of the solvents had a general influence upon the biological activity of the solutions. Providing that the physical properties of the solvents were similar, insecticides were more effective in paraffinic hydrocarbons than in aliphatic long-chain esters and related compounds, and were least effective in aromatic esters. Physical

properties of the solvents were of importance in determining the effectiveness of insecticides dissolved in a group of solvents of similar chemical structure. Viscosity was an especially reliable guide as it presumably controlled the rate at which the solution could pass from the paper and be absorbed by the insects during the exposure period.

"The order in which the solvents could be arranged with regard to their ability to influence biological action was the same for all the insecticides used, but the ratios of the median lethal concentrations in different solvents varied greatly from one insecticide to another. Consequently, the relative toxicities of the insecticides depended upon the solvent in which they were dissolved.

"When some of the solutions used in filter-paper tests were applied topically to the insects the differences in effectiveness were greatly reduced, showing that an important influence of the solvents had been upon pick-up of insecticide from the papers. However, even with topical applications there were still some differences in median lethal concentrations and especially in rates of action between the solvents, thus providing further evidence that the solvent is also concerned with passage of insecticides through the insect cuticle.

"The relative toxicities of the solutions bore no relationship to the solubilities of the insecticides in the solvents, and it was concluded that in these experiments chemical potential was not likely to be a controlling factor."

LICHTENSTEIN, E. P. **Movement of Insecticides in Soils under Leaching and Non-Leaching Conditions.** *J. Econom. Entom.* 1958, June, v. 51, No. 3, 380–83, 1 fig. [16 refs.]

MISCELLANEOUS PAPERS

REIFF, B. **Some Special Problems in relation to the Care and Management of Laboratory Animals in a Tropical Environment.** *J. Inst. Sci. Technol.* London. 1958, July–Sept., v. 4, No. 3, 18–58, 11 figs., 7 graphs & 10 pls. [24 refs.]

This is a long and detailed account of the difficulties encountered in keeping and breeding laboratory animals for scientific purposes in an underdeveloped tropical country, and how they have been overcome. The complete article should be consulted by anyone responsible for keeping and breeding such animals in a similar climate and under similar conditions.

Two main considerations should be given to the site of the animal house: exclusion of sun and adequate ventilation. For the former the

long axis of the building should be oriented east and west to expose as small an area as possible of the walls to the sun, and for the latter the long axis should be at right angles to the prevailing winds. These two may be incompatible and a compromise may have to be effected by moving the long axis more or less at an angle to the east-west position. In a hot humid country more consideration should be given to ventilation and in a hot dry country to protection from the sun.

A ridged roof is undesirable as a permanent reservoir of hot air tends to build up in the angle of the ridge. A sloping double roof with an air space is better and cheaper. The outside roof should be made of corrugated anodized aluminium which is cooler than galvanized iron as it reflects 85% of solar radiation and 92% of thermal radiation. The inner roof, which serves also as a ceiling, should be made of hardboard or strawboard which is light, unbreakable and termite-proof. Walls are best built from hollow concrete blocks, of which several hundred a day can be manufactured by 3 or 4 unskilled labourers with a simple hand-operated machine. Concrete should be made with pure washed sand free from all vegetable or organic material which would attract termites. "Landcrete" made from cement and powdered laterite is useless. Walls made with it were destroyed in a few years by termites. Doors and windows should be steel, windows of the louvre type hinged in the centre. Polished aluminium louvres suspended outside or inside the windows will exclude heat radiation through an open window. The whole building should be made mosquito-proof. A good water supply is essential. Ants can be excluded by a moat 4 inches deep by 6 to 8 inches wide surrounding the building and filled with water. Trees and climbing plants must not be allowed to come in contact with the building.

A well-trained and reliable staff is essential but in West Africa this is one of the greatest problems.

From the point of view of hygiene and serviceability cages made of metal are best but expensive. The usual mouse cage as used in Britain is unsuitable. Imported mouse cages were altered by removing the lid and replacing it by a wooden frame with wire netting. This could be done only with cages made with galvanized iron. Mice nibbled away the edges in aluminium boxes thus altered. As an alternative to imported cages some were made out of local mahogany at a cost of 15 shillings as compared with £6 to £7 for the imported cages. Guineapigs may be kept in concrete enclosures. Outside pens were constructed for rabbits used as stock or for breeding purposes. The area of a rabbit run was 3 feet by 6 feet which is sufficient to house 6 to 10 rabbits. The roof, of corrugated aluminium, sloped from 6 feet in front to 3 feet at the back. The walls, of wire netting, were continued 2 or 3 feet underground as the floor was left in its natural state to allow the animals to burrow and breed. [The abstracter had unfortunate experiences with a similar attempt to keep rabbits in a run. During heavy rains the feet of the rabbits became balls of mud and in the dry season they were severely affected by chigoes.

Wire netting was not adequate to keep out the smaller carnivores and small-mesh expanded metal had to be used. A concrete floor had to be provided, with boxes for nesting. Incidentally, guineapigs thrive well in the same run as rabbits.]

Bedding may consist of sawdust or wood wool from packing cases. Local sawdust may be used but care must be taken to see it does not contain substances toxic to the animals. Clean river sand may be used for mouse cages and locally obtained rice husks make excellent bedding if obtained fresh and clean.

Diet is important; an adequate protein and vitamin intake is essential. Mice and rats revert to cannibalism and eat their litters on a protein-deficient diet. Rats will either abort or not conceive on a diet low in tocopherols; guineapigs may cease reproduction if the diet is insufficient in fresh greens.

Though a diet may be composed of local materials it was found advisable to obtain the stabilized diet as manufactured by The London Association of Flour Millers Ltd., whose Diet 41B and Diet 18 in cube form are reliable and stand up reasonably well to being shipped abroad. The only advantage of a local diet is that it is about 30% cheaper than the imported.

Rats were easily maintained on Diet 41B with the addition of 3% whole egg and 3% cod-liver oil and malt. Palm nuts were given to chew and green stuff when available.

A local diet consisting of guinea corn 52%, palm kernel 15%, groundnut meal 25%, bone meal 2% and NaCl 1% was tried on rats but although this maintained the animals in rude health for prolonged periods they lost their ability to reproduce, which shows the absence of some essential factor.

Guineapigs and rabbits can be fed on local vegetables in the wet season but in the dry season when green vegetables are not easily obtainable Diet 18 in cubes will suffice. Although adequate green food is necessary for guineapigs they may be maintained on Diet 18 for several months without ill effect or interference with breeding.

Water is required in large quantities by all animals but more especially by rabbits which seem to be more sensitive to dehydration and heat exhaustion than other animals.

Imported " cube " diets are prepared the previous evening by mixing with 60% water w/w and leaving overnight in the refrigerator.

Monkeys will eat practically anything human beings eat. A diet of yam, meat or liver, beans, salt and a dash of cod-liver oil and malt extract is cooked, and fat in the form of palm oil added. Bananas and other fruit and vegetables are supplied when available.

Notes on the keeping of larger animals are given but the small laboratory would be well advised to leave these to the local veterinary authorities.

Short notes are also given on some diseases of laboratory animals.

P. A. Clearkin

ERRATUM

In the abstract of the article by WADDY, B. B. on Frontiers and Disease in West Africa, this *Bulletin*, 1958, v. 55, 1063, the second sentence of the last paragraph should read: " . . . . the international dissemination of medical information is met by the monthly *Epidemiological and Vital Statistics Report* issued by the World Health Organization . . ."

REPORTS AND SURVEYS

MORAHAN, R. J. **Medical Survey of the Inhabitants of Omu, a Papuan Highland Village, 17th November, 1956, to 24th November, 1956.** *Papua & New Guinea Med. J.* Port Moresby, 1957, Feb., v. 2, No. 2, 48–52.

The entire population (182 of all ages) of Omu, a community in the Highlands of Papua, were examined to assess their nutritional status and to find evidence of active or past disease. Despite primitive living conditions, the inhabitants were found to be alert, happy, and of average healthy appearance. Weight and height in relation to age are given in tables, ages under 3 years being recorded and those over 3 estimated. [The tables are worth noting by anyone interested in such data, though numbers are small.] After a satisfactory growth rate during the first 6 months of life, the rate falls off and adults, though well muscled, are small:—

	Adult males (59)	Adult females (53)
Average height (inches)	60·9	57·4
Average weight (pounds)	118·25	91·25

The staple diet is sweet potato, with little animal protein. No evidence of vitamin deficiency was found. Averages of haemoglobin in adults were 14·2 gm. (male) and 13·7 gm. (female). Only 5 enlarged spleens and 2 malarial infections, both *Plasmodium vivax*, were found. Filariasis, hookworm, yaws, scabies, tropical ulcer, leprosy and active eye disease were not found. Out of 31 positive Mantoux reactions 26 were in adults. Dental caries was very common and most old people were edentulous. During the period August 1953 to November 1956 the were 20 deaths and 20 births; 8 children died before the age of 13 months. *B. B. Waddy*

BOOK REVIEWS

SOUTTAR, Henry [C.B.E., D.M., F.R.C.S.] & GOLIGHER, J. C. [Ch.M., F.R.C.S.] [Edited by.] **Textbook of British Surgery. Vol. III.** pp. viii + 619, 207 figs. 1958. London: William Heinemann Medical Books Ltd., 99, Great Russell Street, W.C.1. [£5. 5. 0.]

Chapter six in the third volume of the *Textbook of British Surgery* has been contributed by Dr. Stanley BELL and is a sensible introduction to many of the day-to-day problems confronting the surgeon in the tropics, and more particularly in the remoter parts of the earth. He rightly brings together at the outset the effects of a hot and humid climate upon all concerned—surgeon, staff and patients. Unfortunately, in spite of what ought to be, operating lists are of necessity often longer and not shorter than in England. There is thus all the more need for care to avoid the pitfalls he mentions and maintain a good standard of work in these difficult conditions. That good results are obtainable with careful attention to detail is partly because of the suitability of spinal anaesthesia and the rarity of post-operative chest and circulatory complications in the tropics.

Dr. Bell devotes nearly one-third of the chapter to medical diseases. The surgeon must always bear in mind the multiplicity of chronic diseases from which most of his patients will be suffering. It is a pity, however, that space was not found to include in the section on surgical diseases such conditions as muscular abscess (tropical pyomyositis) and cancrum oris. It must be realized, too, by the surgeon who is commencing this work that he will be faced with many eye, ear, nose and throat conditions requiring his help. Extraction of cataractous lenses is one of the most rewarding of all operations in the tropics. Tropical ulcer is so successfully cured by penicillin in its early stages that all other methods are obsolete. We are only given a glimpse into the many problems that are yet to be solved in dealing with the protean manifestations of *Schistosoma haematobium* infections. The surgery of schistosomiasis will no doubt one day become a recognized speciality. Incidentally, one wonders whether hydatid disease ought still to be included in diseases of the tropics proper ?

It would have been helpful to have guidance on the differential diagnosis of the acute abdomen in the tropics and this might have been linked with a fuller list of those intriguing conditions with a sharply localized incidence such as nasopharyngeal carcinoma in S. China, adult intussusception in W. Africa, vesical calculus in parts of India and China and melanoma in certain areas.

As mentioned in the following chapter on venereal diseases, many surgical conditions now rarely seen in England are still everyday problems for the surgeon in the tropics. Thus, urethral stricture remains a constant challenge to surgical skill and judgment. The gigantic ovarian and uterine tumours are common enough, too, to need special consideration of techniques both at operation and during rehabilitation.

Chapter seven is on Venereal and Allied Diseases and is contributed by Dr. G. O. Horne. These are important to the surgeon in the tropics and the descriptions of syphilis and gonorrhoea given here are a most valuable synopsis of the essential information he will require on the subject. Unfortunately, the sections on lymphogranuloma inguinale and granuloma inguinale (ulcerating granuloma) are neither so accurate nor complete. It is here that the surgeon will look in vain for guidance. Yet there is a clear-cut clinical picture for each disease and they may be readily recognized by those who meet them frequently. Contrary to what is often stated, granuloma inguinale has an acute onset, is very painful and produces a crippling disability and often causes death in persons of poor resistance. One minor omission is the venereal aspect of scabies which often presents as a puzzling dermatitis of the genitalia.

These two chapters give much useful and practical information to the surgeon in the tropics and the pity is that they could not have been expanded somewhat in order to cover more fully this most fascinating branch of British surgery. *J. R. Rose*

Encyclopédie Médico-Chirurgicale. 1957. Recueil No. 28–29, Cahier 35–36 & 1958. Recueil No. 21–22, Cahier 37–38, loose leaf pp., numerous figs. **Maladies infectieuses.** [Infectious Diseases] [Debré, R. (Edited by)]. **Maladies parasitaires.** [Parasitic Diseases] [Galliard, H. (Edited by)]. Paris VI^{e}: Éditions Techniques S.A., 18, rue Séguier.

The sections in each of these *cahiers* on infective disease are edited by R. Debré and those on parasitic disease by H. Galliard. They include the following subsections:—

35–36th Cahier

Staphyloccaemia, and Treatment and Prevention, by R. Sohier and J. Thivolet.

Meningococcal infections, by A. Herrault and A. Mouy.

Cholera, by F. Blanc.

Brucellosis, by M. Janbon.

Para-rubéoles (Filatow-Dukes disease, erythema infectiosum), by P. Bertoye and A. Bertoye.

Chickenpox, by P. Bertoye and A. Bertoye.

Suette miliaire (the sweating sickness of the 15th and 16th Centuries. but recorded up to modern times in France), by P. Sédallian.

Adenovirus infections, by J. Celers.

Benign recurrent endothelio-leucocytic meningitis of Mollaret, by R. Bastin.

Lymphogranuloma venereum, by P. Durel and A. Siboulet.

Toxoplasmosis, by G. Desmonts.

Cryptococcosis, by A. Grasset.

37th–38th Cahier

Serotherapy and vaccinotherapy, by A. Delaunay.

Gamma globulins in prophylaxis and anti-infectious therapy, by F. Herzog.

Infections due to *Micrococcus tetragenus*, by C. Gernez-Rieux.

Treatment of pneumococcal infections, by R. Fasquelle, D. Christol and F. Poutrel.

Plague, by J. Thiodet and A. Fourrier.

Typhoid and paratyphoid fevers; clinical study; treatment, by H. Baylon and R. Hugonot.

General information on virus diseases, by P. Gastinel and R. Fasquelle.

Rubella, by R. Mande and Mouy.

Scarlet fever, by R. Mande and A. Mouy.

Herpes, by Le Tan Vinh.

Infections due to Coxsackie virus, by A. Herrault and A. Mouy.

Poliomyelitis: diagnosis, treatment, by R. Debré and St. Thieffry.

Poliomyelitis, epidemiology and immunology, experimental study, prophylaxis, by P. Lépine.

Poliomyelitis, official circular of May 24, 1957.

Distomatoses, by Y. J. Golvan.

Ticks and mites, by M. Ansel-d'Imeux.

Chiggers, by M. Ansel-d'Imeux.

As before, each subsection is composed in logical order, the subsection forming an essay in which the whole subject is reviewed, and modern trends are expressed, in some cases with a list of references for further reading. The papers are, in fact, chapters of a text-book rather than summaries of recent advances. The names of the contributors are sufficient evidence of the authority with which the whole publication is conceived.

The various subsections are printed in such a manner that they can be inserted at appropriate places in the whole volume, and the whole forms a very comprehensive system of medicine and surgery which can in this way be kept up to date. *Charles Wilcocks*

Rodenwaldt, Ernst & Jusatz, Helmut J. [Edited by.] **Welt-Seuchen-Atlas.** [World Atlas of Epidemic Diseases] Part III. 2nd issue. pp. III/1–III/6, III/17–III/24, III/31–III/34, III/45–II/50, III/65–III/66, III/101–III/104, III/111–III/112, 2 text figs. & 10 folding pp. of coloured maps. [Numerous refs.] 1958. [In German & English.] Hamburg 1: Falk-Verlag, Burchardstrasse 8.

Volume III of this series is now continued with maps and texts resembling those in the series which have been previously reviewed [this

Bulletin, 1953, v. 50, 772; 1955, v. 52, 499; 1956, v. 53, 951; 1957, v. 54, 246, 247 and 1379]. Material in the present issue deals with cholera in Asia by E. RODENWALDT, bacterial dysentery in Asia by H. SEELIGER, a diphtheria world map by H. KANTER, the twentieth century pandemic of plague by H. RAETTIG, the world distribution of poliomyelitis by W. DONLE, the world distribution of smallpox by G. HENNEBERG, that of trachoma by R. SIEBECK, and of filariasis by A. ERHARDT and U. WELLENSIEK; it concludes with a map demonstrating the world distribution of sultriness by K. SCHARLAU and with a basic geographical map of Asia on a scale of 1:15,000,000.

The series is by now considerable and has assumed a form which is reasonably standardized so that it is now possible to examine not only the detail of individual maps and sections of text, but also the continuity of the series to see how material in consecutive issues builds into a coherent picture of general epidemiology. There is a marked tendency for individual authors to take up a local example of the distribution of disease, as for instance filariasis in Africa, in one issue and in later issues to combine the material contained in this with other information to produce a section of wider application, sometimes of world distribution of the disease. The sections in the present issue on poliomyelitis, trachoma, smallpox, diphtheria, filariasis and plague appear to be the culmination of a series of this type and it is interesting to put them together and examine them. There have been three previous sections on plague dealing with its distribution in Europe, Africa and America and in this issue there is one on its world incidence. The information provided for Asia, which has not previously been handled, is of course entirely new and gives much information which will be of value to the student although little is added to the information which has previously been given for other parts of the world, for which the present maps form a summary.

The authors do not quite grasp an opportunity which one might have thought the material offered. The early origins of the great pandemic which formed the disaster of the first part of this century are of the greatest interest and would merit the most detailed study and the fullest possible reference to original sources of information. However, the reference material forms more of an introduction to the subject than a full survey of it, a comment which might apply also to the bibliography attached to the sections on cholera, smallpox, trachoma and poliomyelitis.

The number of endemic and epidemic diseases which have now been analysed is considerable. There are, however, a number of non-infective conditions which might well be susceptible to this form of treatment, such as the blood groups, the abnormal haemoglobins, the incidence of neoplasms, and similar matter. The modern HIRSCH would surely include matter of this type, experiment in which would be interesting.

G. Macdonald

Richardson, U. F. [B.Sc., M.R.C.V.S.] & Kendall, S. B. [B.Sc., Ph.D., A.R.C.S., M.R.C.V.S.]. **Veterinary Protozoology.** 2nd Edition, revised. pp. xii + 260, numerous illustrations. 1957. Edinburgh 1: Oliver & Boyd, Tweeddale Court. London: 39A, Welbeck Street, W.1. [22s. 6d.]

Veterinary Protozoology was first published in 1948 [see this *Bulletin*, 1948, v. 45, 1135] and the present volume—the second edition—bears little resemblance to the original as the authors have completely recast the material and rewritten several chapters. Thus the systematic arrangement of the protozoa now follows the zoological classification beginning with the Mastigophora and ending with the Ciliophora, whereas the first edition began with three chapters on the Sporozoa and finished with the Rhizopoda and Ciliophora put together in a single chapter. It will therefore be of value to redescribe the contents.

The first chapter, comprising 14 pages, gives a brief general account of the history, morphology, physiology and ecology of protozoa. Chapter 2 (9 pages) gives a general description of Mastigophora, the family Trypanosomidae and genus *Leishmania*. The next 4 chapters are devoted to *Trypanosoma*, its epidemiology (7 pages), host-parasite relationship (11 pages), morphology in the vertebrate host (18 pages) and its control by chemotherapy and by elimination of vectors and reservoir hosts (8 pages). The other Mastigophora of veterinary importance, *Trichomonas*, *Hexamita* and *Giardia*, are described in Chapter 7 (15 pages). Chapter 8 (7 pages) gives an account of *Histomonas* and *Entamoeba*. The next 4 chapters give an account of the Sporozoa, the Coccidia (chapter 9, 27 pages), Haemosporidia (chapter 10, 14 pages), *Babesia* (chapter 11, 27 pages), finally a group of diverse Sporozoa, *Aegyptianella*, *Theileria*, *Toxoplasma* and *Encephalitozoon* (chapter 12, 19 pages). Chapter 13 (11 pages) describes a mixture of organisms, *Balantidium*, *Anaplasma*, *Eperythrozoon*, *Bartonella*, *Grahamella*, *Sarcocystis* and *Globidium*. The remaining 2 chapters give an account of chemotherapy and a brief description of methods used for fixing and staining, maintenance of protozoa in the laboratory and serological techniques (chapters 14 (25 pages) and 15 (34 pages) respectively).

Although diagnosis of a disease can sometimes be made from clinical symptoms, final proof involves identification of the parasite. The success of a protozoological text-book consequently depends on morphological descriptions and illustrations. In this respect, the student will meet with difficulty if this text-book alone is used, on account of the brief account of morphology and inadequacies of the illustrations. The line illustrations are usually so devoid of detail as to be almost diagrammatic and give little idea of the actual appearance of the organism. Further, the figure illustrating a section of a rabbit's bile duct infected with *Eimeria stiedae* (facing p. 110) appears to be a wash drawing and gives no conception of the microscopic appearance of infected tissue. On the other hand,

the coloured frontispiece is good, but the protozoa are not drawn to the same scale and this is not stated in the legend.

In the text there are many misleading statements. In discussing the ecology of parasitism the authors state that the host-parasite relationship may change " From the symbiotic to the parasitic habit " (p. 9), without any consideration that the reverse may also occur. The peritrophic membrane in *Glossina* is said to be a dialyser " between mid- and hind-gut " (p. 27); in fact it is synthesized by cells at the anterior end of the mid-gut and passes backwards through the mid- and hind-gut. Reserve materials in the cyst of *Entamoeba* are called " chromatin rods " (p. 88); as is well known chromatin signifies nuclear material and although these bodies stain black with haematoxylin stains they have no connexion with the nucleus. The occurrence of pseudocysts in the life history of *Toxoplasma* is not described.

There is a confusion of nomenclature concerning the granules at the base of the flagella. On p. 5 the authors describe the granule at the origin of the flagellum as the basal granule, which may be connected with the blepharoplast. However, on p. 15 the flagellar-origin granule becomes the blepharoplast, while the associated granule is called the parabasal body. The authors proceed to define the term kinetoplast, which is then used in the description of trypanosomes, except for *T. equinum*, which is described as *T. evansi* in which the " parabasal body is usually absent " (p. 50).

From the selection of criticisms, it can be seen that they mainly relate to the zoological aspects of veterinary protozoology. On the other hand, the ecology of protozoa of economic importance is well described, in particular coccidia and piroplasms are treated fully. The chapter on techniques is useful, but it is doubtful whether the historical survey of drugs and description of experimental methods for studying chemotherapy serves any good purpose in this book.

In conclusion, this book is a useful supplement for students studying veterinary protozoology, but it is disappointing that such errors should be found in a second edition. *R. A. Neal*

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